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In this Issue—

SELF-FLUXING SINTER
Italian Production Experiments - - - - page 851

MECHANIZATION OF A THIN SEAM
Project at North Warwick Colliery - - - page 855

MANUFACTURE OF CRANKSHAFTS
Heavy Weights in Marine Diesels - - - - page 863

COAL HANDLING AT POWER STATIONS
Installation at Willington - - - - - page 867

NON-DESTRUCTIVE TESTING OF STEEL
Methods in Current Use - - - - - page 869

	PAGE
Leading Article: Cheaper Steel	841
Government Should Own One Steel Plant	841
Passing Thoughts	842
NCB Boxing Finals at Glasgow	842
Recruitment of Miners in East Midlands Division	842
Stainless Steel	843
Davy-United Forms Steel Processes Division	843
Obituary	844
"Wildcat" Strikes	845
Scottish Power Plants to Stick by Coal	845
Cold Forging Process Developments	846
Increased Traffic for South Wales Ports	846
Shipbuilding Merger Reports are "Pure Speculation"	846
ECSC Steel	847
Japanese Order Boosts Canadian Minerals	847
Shipbuilding Chief Answers the Critics	847
Non-ferrous Metals	848
Shipyard Labourers' Wage Claim	848
Seven Candidates for NUM Presidency	848
£24,000,000 Plan	849
Locomotive Order-books Full Until 1962	849
Alfred Herbert Success with New Machines	849
Council Claims on RTB for Road Damages	849
Personal	850
Colliery Managers' Conference	854
Forthcoming Events	862
Book Review	865
Plastics Ventilation Tubing	866
Ventilation Problems at Mechanized Coal Mines	868
Iron and Steel Industry on Postage Stamps	872
New Equipment and Products	873
Programmed Forging Operation	875
Future for Smokeless Fuel	876
North-Western Divisional Coal Board Changes	876
In Parliament	877
Law Cases	879
Company News	881
Iron and Steel Trade	883
Steel, Peech & Tozer to Instal APIC	883
End of Miners' "Bull Week"?	884
Greater Mechanization Means More Pit Accidents	884
The Coal Trade	885
Recent Wills	885
Coalfield News	886
Sales Drive for Oversea Coal Markets	887
Secretary of Five Indian Government Committees	887
Simon Group Announces Higher Dividends	887
Orders Placed	888
Birmetals' £1,000,000 Aluminium Strip Mill	888
Appointments	889
NUM Fears Dwindling Manpower in Midlands	889
The Scrap Markets	890
Board Changes	890
News in Brief	892
Current Prices of Iron and Steel	894

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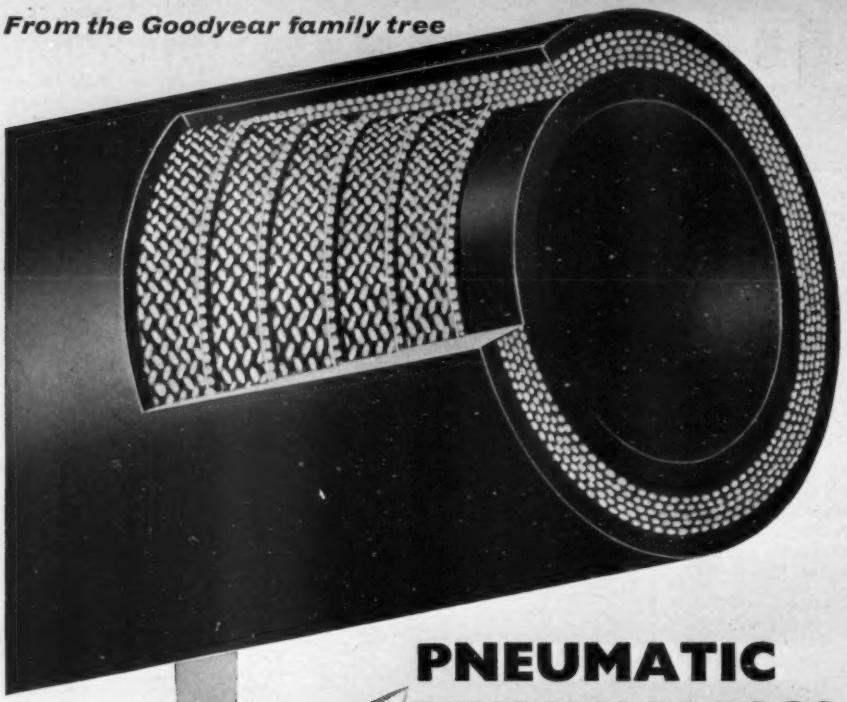

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IRON AND COAL
TRADES REVIEW

Vol. 180 April 15, 1960 No. 4,787

Cheaper Steel?

ABOUT 6 per cent. of the national output of steel is affected by the changes in maximum prices authorized by the Iron and Steel Board which came into effect on Monday last. Superficially, the variations present no recognizable pattern. Some substantial rises have taken place, and in other instances buyers get the benefit of lower prices.

The laconic comment of the board which accompanied the new price schedules is that they represent "corrections" in the structure, and on balance will have no appreciable effect on the general level of steel prices, but they have nevertheless started off a train of speculation concerning the prospect of a more widespread adjustment of steel prices.

It is the established practice of the Iron and Steel Board to determine selling prices in the light of full information on the cost of production in a modern plant, and in fact it is disclosed that the most significant changes which have become operative this week in the prices of stainless steel products—some upwards and some downwards—have been decided in the light of experience gained in producers' costs in the most modern plants.

Applying the same standards, the last three general revisions in the steel trade have each resulted in reduced prices to the consumers, and this in two years when inflationary influences have become more apparent in most commodity markets.

Arguments in favour of further cuts are not without validity. The cost economies achieved by mass production are patent in every sphere of industrial activity, and not least in the steel industry, which has achieved full employment for plant and personnel. Are the financial advantages arising therefrom wholly swallowed up by increases in the cost of labour and materials? Only the Iron and Steel Board has the right to demand the detailed information on which an authoritative answer can be based. Its investigations into the cost and price structure of the industry are constant and it may be that predilections in favour of lower prices are influenced by a Government which is ceaselessly pressing for lower prices and reduced profits.

It has become manifest that the emphasis for all manufacturers must be devoted to cost reduction as well as physical expansion, and as world output of steel goes on rising, so also is a further fall in prices becoming transformed in the minds of consumers from a possibility to a probability.

Government Should Own One Steel Plant

IN his speech in the Budget debate last week, Mr. George Darling (Lab.) insisted that there was a good unprejudiced case for the Government having at least one big steel plant in its possession. Richard Thomas & Baldwins, Limited, was efficient, well managed, and prosperous under public ownership. To sell out its equity to private shareholders would not improve its efficiency, its opportunities for development, or its worker-management relations.

"The management of the steel industry is now in such a position that management has ceased to be responsive to shareholders—the shareholding is too diffuse," he said. "If we look at the shareholdings of the United Steel Companies, Limited, we find that it would be quite impossible to get them all into one hall in the country. They have more shareholders than workers." Shareholders were scattered; individual holdings on the average were too small, and in practice the shareholders could not exercise any control over the management.

Mr. Darling conceded that the steel companies which had been sold out had not abused their freedom. With some rather worrying exceptions, they had worked with the Iron and Steel Board and had leaned over backwards to show that they were public spirited.

They were doing very well and if general industrial expansion which depended on steel was to continue some companies would have to be pushed into taking risks in building new plants and expanding plants to meet potential future demands for steel. "If they hesitate we may find the general expansion we want will be handicapped through a shortage of steel," Mr. Darling said.

He thought the Government was making a profound mistake in having no stake at all in the industry and in giving up the means of making good in the expansion of its own plant the deficiencies of the private companies.

Following the denial by the financier, Mr. Charles Clore, that he and his associates had laid before the Treasury a scheme for handling the denationalization of RTB, but that "he would be interested if there were an opportunity to acquire a substantial holding in that company," the Treasury stated that it was not the practice of the Iron and Steel Holding and Realization Agency or the Treasury to comment on rumours about bids or prospective sales of steel companies in public ownership.

Safety-concious TI Group Companies

NEW developments in industry bring with them new hazards and nothing less than constant vigilance is necessary not only to maintain but also to improve previous safety records, said Sir David Watherston, director of personnel, Tube Investments, Limited. He was speaking at the presentation of the TI "Progress in Safety" trophy on Thursday of last week.

To win the trophy Weldless Steel Tube, Limited, Wednesfield, has improved on its own safety figures by an average of 26 per cent. in the past four years. Reynolds TI Aluminium, Limited, Birmingham, was runner-up with a 24.7 per cent. improvement.

Among the smaller TI companies Tube Products, Limited, Tividale was awarded a certificate for three years' accident-free operation. Five of the TI companies were accident free for the whole year.

Passing Thoughts . . .

IT is false economy to close down pits or seams where there is still plenty of coal, even if it is uneconomic at the moment to work them. The better policy is to concentrate output on a few coal faces or pits, and to work these until there is no coal left. We ought not to be greedy and take all the best coal now, leaving nothing for our grandchildren.—MR. RICHARD DENMAN, of The Economist, in an article in the Guardian Journal, Nottingham.

The most unprofitable take-over is that enforced by the State in nationalization.—Letter in the Financial Times.

Is it not a brutal fact that much of the difficulty experienced by the National Coal Board has been due to their inheriting a situation in which the employment of their people—the miners—was treated as the basic primary task, rather than the winning and selling of coal? At the eleventh hour the gravity of the situation has forced them to recast their strategy and to put first things first.—Another letter in the Financial Times.

The problem of ensuring that supplies [of smokeless fuels] are adequate comes close to being a problem of ensuring that people install enough stoves of the new types; and if this is to be done while the customer retains a sense of freedom of choice some ingenuity is required.—Leader in The Times.

It is an odd experience to stand in the bottom compartment of a double-decked "Yorkshire" type fermenting vessel (preferably empty) as big as a bus, completely surrounded, except for the manhole to the upper deck, by gleaming stainless steel surfaces with smoothly polished welded joints. And to see a battery of these in operation during the fermenting process brings to mind the old adage that says "there is no bad beer—it's just that some is better than others."—MR. S. H. JACKSON, of Firth-Vickers Stainless Steels, Limited, in an article in the Yorkshire Post.

If a country's wealth can indeed be judged by its consumption of steel and the growth of its transport then the barometer for 1960 *is set very fair.*—MR. EDWARD T. SARA, *of the United Steel Companies, Limited, in an article in the Yorkshire Post.*

As we grow up with virtually full employment the use of automatic machines must increase the tendency to get things faster, cheaper, and better, not necessarily make work dull, less human, or more soul-destroying.—LORD VERULAM, chairman of the British Institute of Management.

Presentation to Former PIMA Committee Member

PRESENTATION of a silver salver was made before the annual meeting last week of the Pig-iron Merchants' Association, to Mr. F. Arnold Wilson, the association's chairman from 1951 to 1955. Mr. Wilson was a member of the committee for 13 years.

The officers elected were:—Chairman, Mr. R. W. Neale, a director of J. C. Abbott & Company, Limited, Birmingham; vice-chairman, Sir Charles V. Fitton, a director of Parson & Crosland, Limited, London, E.C.2; treasurer, Mr. C. A. Parson, Parson, Limited, Birmingham; secretary, Mr. S. Owen.

NCB Boxing Finals at Glasgow

ENTHUSIASM shown at the semi-finals of the mineworkers' boxing championships at Hanley and Leeds augurs well for the national finals, which are to be held at the St. Andrew's Hall, Glasgow, on April 23. The reappearance, after an absence of two years, of contestants from the NCB's South-Western Division has given a fillip to this year's championships, which have been well supported throughout.

At Glasgow, 20 champions from the various divisions will compete for the 10 titles, in addition to which there will be six special contests. The Kinneil Colliery Silver Band will play for an hour before the boxing starts at 7 p.m.

Details of the championship bouts are as follow:—FLYWEIGHT: D. James (South-Western) *v.* A. Gilmour (Scottish). BANTAMWEIGHT: W. H. Williams (West Midlands) *v.* R. Galloway (Scottish). FEATHERWEIGHT: D. Bowers (South-Western) *v.* C. Salter (Scottish). LIGHTWEIGHT: D. Harris (South-Western) *v.* J. E. Ginty (Durham). LIGHT WELTERWEIGHT: G. W. Rees (South-Western) *v.* P. O'Rorke (North-Eastern). WELTERWEIGHT: J. Gamble (South-Western) *v.* F. Powney (North-Eastern). LIGHT MIDDLEWEIGHT: N. Biggs (South-Eastern) *v.* S. Pearson (North-Eastern). MIDDLEWEIGHT: J. M. Wood (West Midlands) *v.* T. Casserly (Scottish). LIGHT HEAVYWEIGHT: J. G. Bodell (East Midlands) *v.* J. Taylor (North-Eastern). HEAVYWEIGHT: E. Ball (West Midlands) *v.* J. G. Mitcheson (Durham).

Tickets are already being taken up. Reserved seats (21s., 15s., 10s. 6d., 7s. 6d., 5s. 6d., and 3s. 6d.) may be booked from Mr. A. W. Laird, National Coal Board Amateur Boxing Association, 24 Royal Circus, Edinburgh 3 (telephone: Caledonian 2692).

Recruitment of Miners in East Midlands Division

DENIAL that the East Midlands Divisional Coal Board was opening the pits of Derbyshire to wholesale recruitment was made by Mr. Rex Ringham, divisional chairman, last Friday. Addressing members of mine rescue teams at a dinner in Chesterfield, Mr. Ringham spoke of the difference of opinion between the board and the National Union of Mineworkers over the question of recruitment.

What the board was trying to do, he went on, was to recruit men for certain undermanned pits, mainly in the Mansfield, Edwinstowe, and Nottingham areas.

He said it was comforting to see that since the beginning of this year nearly 1,000,000 tons of coal had been picked up in the division.

Mr. Ringham presented long-service certificates and medallions to more than 60 rescuemen. These included a special presentation to Mr. G. W. Pearce, of Glapwell Colliery, near Chesterfield, who is retiring from rescue work at the age of 45, after 22 years' service. Among the guests were Mr. W. Whitehouse, HM Inspector of Mines, and Mr. N. Gee, divisional staff director. The chairman was Mr. N. Siddall, general manager of No. 1 (Bolsover) Area.

BRADLEY & COMPANY, LIMITED—Mr. T. A. Allen has resigned as vice-chairman.

Stainless Steel

REVISED PRICES ANNOUNCED

MAXIMUM prices of a limited range of steel products are revised with effect from April 11. The products concerned are stainless and alloy steels, cold rolled carbon steel strip, and certain specifications of non-alloy bright steel bars and heavy rails. The changes, of which some are upward and some are downward, represent corrections in the structure and on balance they have no appreciable effect on the general level of steel prices.

In the case of non-alloy bright bars, the changes are in the extras for annealing or normalizing and cutting to length. Basis prices for heavy rails are unaltered, but the extras for special lengths have been revised.

The most significant changes are in stainless steel, the price schedule for which has been extensively recast in the light of experience gained in costs at modern plant. Broadly speaking, the maximum prices of stainless steel bars are being increased and those of stainless steel flat products decreased, but this does not apply to all sizes and qualities. The price increases for certain sizes of stainless steel bars and the price reductions for the thinnest of the stainless steel strip are substantial.

Some Examples

The Iron and Steel Board give the following examples:—

Stainless Steel—Black bare, 1 in. dia., austenitic, new price £283 10s. per ton (£5 up). Martensitic S62, £188 10s. (£15 up).

Bars, ¼ in. dia., austenitic, £408 10s. (£40 up). Martensitic, S62, £313 10s. (£50 up).

Bars, 2 in. by ¼ in., austenitic, £420 (£100 up). Martensitic, S62, £360 (£144 10s. up).

(The estimated overall increase in stainless steel black bars is £13 per ton.)

Plates, 36 in. by 72 in. by ½ in., austenitic, £341 (£12 down). Martensitic, S62, £250 (£6 10s. up). The estimated overall decrease in stainless steel plates is £9 per ton.

Cold-rolled strip, austenitic, 3 in. by 14 g., £420 (£5 down); 3 in. by 30 g., £561 (£28 down); 3 in. by 40 g., £1,083 (£491 down). The estimated overall decrease in cold-rolled stainless steel strip is £13.

Alloy Steels—EN. 10 quality basis price billets, £47 (7s. down); black bars, £67 17s. (13s. down). EN. 10 annealed bars, 1¼ in., £73 17s. (19s. 6d. up). EN. 18 basis price billets, £49 5s. (20s. up).

Cold-rolled Carbon Steel Strip—Mild steel, 6 in. by 17 g., £57 15s. (10s. down); high carbon, £72 (£2 up).

HOPES FOR UK REACTOR SALE TO INDIA

GOOD prospects of the purchase by India of a nuclear reactor from Britain were reported on Saturday by Mr. R. N. Millar, a director of the General Electric Company, Limited. Mr. Millar, who has been in India for preliminary negotiations, said that Britain was competing with others for the contract, which would be worth millions of pounds.

The principal opposition came from France, whose reactor was developed along similar lines to ours.

Davy-United Forms Steel Processes Division

STEEL processes division has been formed by Davy & United Engineering Company, Limited, of Sheffield (a subsidiary of Davy-United, Limited), to absorb the personnel and carry on work previously undertaken by Davy British Oxygen, Limited.

Davy British Oxygen was established over three years ago jointly by Davy-United and British Oxygen Company, Limited, to investigate the various kinds of pneumatic steelmaking processes and to carry out the basic engineering studies necessary for the design of complete oxygen steelmaking plants.

Because of the rapid expansion of oxygen steelmaking throughout the world, an expansion of activity by the joint company is necessitated, it is stated, and the two companies have agreed that the execution of prospective contracts for oxygen steel melting shops should be handled by Davy-United, in view of its experience of large-scale contracts involving heavy steelworks plant. Davy British Oxygen will remain in existence, acting as the focal point for future collaboration.

Davy-United's steel processes division is at Suffolk House, Suffolk Road, Sheffield 2, and is staffed and equipped to provide metallurgical, technical and economic surveys against any projected steelmaking development; design services for oxy-steel equipment; and the engineering and supply of oxygen steelmaking plant up to complete melting shops.

Changing Pattern of Employment

DURING February, there was a net movement of workers out of mining and distribution into manufacturing, construction, and professional services. In the manufacturing industry there was a net movement out of textiles and shipbuilding into engineering and metals.

Mining and quarrying and the distributive trades lost 6,000 workers each while engineering gained 8,000, vehicles 7,000, and metal manufacture 4,000. Altogether manufacturing gained some 22,000 workers.

There was more overtime and less short-time worked than a year ago. In the last week of February 1,707,500 workers were on overtime, 403,000 more than February last year, but 56,500 fewer than three months ago. There were 19,100 fewer working short-time than in January and, at 36,400, the figure is 96,000 fewer than the previous year. The average number of hours of overtime worked was unchanged at 7¼, and the average number lost on short-time was 11, against 10½ in November and 12½ a year ago.

Obituary

SIR TRISTRAM EDWARDS

FIFTY years of service to British shipbuilding ended on Sunday with the death of Sir Tristram Edwards, honorary president and former chairman of Smith's Dock Company, Limited, Middlesbrough. Sir Tristram, who was born in 1882, joined the company 20 years later and was appointed assistant managing director in 1914. On his return from military service he was appointed assistant managing director in charge of shipbuilding and repair. He became chairman of the company in 1948 and resigning eight years later was made honorary president of the company, retaining a seat on the board until last September.

He was associated with many other industrial undertakings and was a director of the Consett Iron Company, Limited, the Consett Spanish Ore Company, Limited, and the New Jarrow Steel Company, Limited. In 1933 he was president of the Shipbuilding Employers' Federation and did outstanding work during the last war, presiding for two years over the Ship Repairers' Central Council and later the Shipbuilding Conference. He was knighted in 1942.

MR. D. W. HARGREAVES

THE death took place on April 3 at his home, Carlton House, Rothwell Haigh, near Leeds, of Mr. Dennis Walter Hargreaves, for many years a member of the National Association of Colliery Managers. He was 78. Mr. Hargreaves was the eldest son of the late Walter Hargreaves, Ll.D., and from the commencement of sinking in 1912 until the advent of nationalization, was manager and later agent-manager of the Water Haigh Colliery, Oulton, near Leeds.

He was a director of Briggs Collieries, Limited, and the Henry Briggs (Trust) Company, Limited, and a member of the Midland Institution of Mining Engineers. His only son is Mr. Gerald Hargreaves, one of HM Inspectors of Mines and Quarries.

MR. STANLEY ROBSON

BY the death of Mr. Stanley Robson, chemical engineering has lost one of its leading authorities. Mr. Robson, who was born in 1888, gained prominence in the first world war when his work in building and operating a contact plant for the manufacture of sulphuric acid brought him recognition as an authority in this field. Later his work for the National Smelting Company, Limited, at Avonmouth in developing acid production from zinc blende proved a great success and led to a number of developments of the zinc industry in this country and elsewhere.

He was works director of the company until 1945 and then its director of research and development, becoming consultant to the Zinc Corporation in 1947. He was a past president of the Society of Chemical Industry, the Institution of Chemical Engineers, and the Institution of Mining and Metallurgy, and was made an honorary Fellow of the Imperial College of Science and Technology in recognition of his achievements in the chemical industry and in extraction metallurgy and of his services to past and present students of the Royal College of Mines.

Former training and safety officer at Thornley Colliery (Co. Durham), Mr. CHRISTOPHER ALDERSON has died at the age of 74. He retired seven years ago.

Mr. R. C. C. POTTS, managing director of the Grimsby firm of steel, iron, and scrap merchants, Jonathan Potts, Limited, has died at the age of 90.

Mr. JOHN CHARLES GROOCOCK, a former director of Sulzer Bros. (London), Limited, mechanical engineers, etc., died on Thursday of last week. He was 73.

Cllr. GEORGE HARDMAN, principal of Geo. Hardman, Limited, production engineers, of Heywood (Lancs), died on Monday of last week. Cllr. Hardman, who was 65, was deputy mayor of Heywood.

Mr. JAMES MUIR, chairman and president of the Royal Bank of Canada, died on Sunday, at the age of 68. He was a director of several important concerns, including the Algoma Steel Corporation, Limited, of Canada.

The death occured recently at sea of Mr. WILLIAM WHALEY TENNENT, who was for many years a director of Bull's Metal & Marine, Limited. Mr. Tennent, who was 75, began his career with John Brown & Company (Clydebank), Limited, joined Bull's Metal & Marine in 1914 and was associated with the firm until his death.

Mr. ALEC GEORGE VAUGHAN-LEE has died at the age of 92. He was well known for his work on barrages and dams in the Middle East and for the revised plan which he helped to produce in 1936 for the construction of a tunnel between Dartford and Purfleet. In 1945 he was a member of the Minister of Fuel and Power's commission on the Severn barrage scheme.

Mr. THOMAS WILTON, past managing director and chairman of Renwick, Wilton & Dobson, Limited, coal distributors, etc., of Torquay (Devon), died last Friday, at the age of 71. Son of the founder of the company, which he joined in 1905, Mr. Wilton was also chairman or director of T. & C. Wilton & Company, Limited, the Plymouth Coal Company, Limited, Dunkerton Coal Factors, the Devon Dock, Pier & Steamship Company, Limited, Pensford & Bromley Collieries (1926), Limited, and Philip & Son, Limited, engineers and shipbuilders, of Dartmouth (Devon). He was house coal officer for the South-Western Region under the House Coal (Emergency) Scheme from 1940 to 1953, and was made CBE for his services in 1946. From 1946 to 1957 Mr. Wilton was vice-chairman of the Seaborne Coal Traders' Association.

Finnish Steel Output

STATISTICS issued from Helsinki show that 224,851 metric tons of raw steel was produced in Finland last year against only 177,048 tons in 1958. Pig-iron output fell during the period from 101,045 tons to 96,210 tons. Rolled steel produced amounted to 256,997 (148,440) tons.

The figures for rolled products included 104,559 (64,460) tons of ferro-concrete steel, 54,220 (18,750) tons of rails, and 43,548 (25,293) tons of rolled wire. A record amount of scrap iron—more than 100,000 tons—was collected for use in the ferrous metals industry.

"Wildcat" Strikes

COLLIERY DEPUTIES WANT RUTHLESS ACTION

RUTHLESS action should be taken against unofficial stoppages and restrictive practices, said Mr. W. Grundy, vice-president of the National Association of Colliery Overmen, Deputies, and Shotfirers, at the association's annual conference in Torquay last week. He said that they not only disrupted the economy of the industry but brought the trade union and trade union movement as a whole into disrepute. "Those of our members who exploit their terms and conditions of employment should be given no support if disciplinary action is taken against them," he added.

Never before in the history of the coal-mining industry, he went on, had there been so much concern and insecurity. This concern had been increased by the Government's refusal even to consider a national fuel policy, although pressed to do so by the TUC and the National Coal Board and all unions within the industry.

"It is therefore obvious to all of us that we cannot expect any better treatment in the future from the Tory Government. We must work out our own salvation along with the NCB in order to survive as a nationalized industry," he said.

Menace from Oil

The national secretary, Mr. J. Crawford, said in his report that the extent to which oil had supplanted coal in industrial and domestic use was "extremely disturbing." It was impossible to assess accurately the amount of coal which oil had supplanted over the past three years, but it amounted to many millions of tons, he claimed. Competition would become more intense as it appeared that the Government did not intend to restrict the importation of fuel oils. Pursuing this "free for all" policy was bound to have a continuing grave contraction on the industry, he added.

A resolution calling for a "National Energy Board" comprising representatives of the NCB, the National Gas Council, the Central Electricity Authority, and the Atomic Energy Commission, was remitted to the executive committee for further consideration. Mr. Eric Lockett (Yorks), who moved the resolution, commented: "We have not as yet been able to get anyone in a position of authority to make any declaration of fuel policy for the future." He said that personal requests had been made to the Minister without results.

Delegates passed a resolution instructing the executive to consider the possibility of arranging a one-day conference to discuss recent mine disasters in order "to arrive at some national conclusions which would safeguard and benefit under officials for the future." The resolution was proposed by Mr. W. Levitt (Yorks) and seconded by Mr. J. Lowe (Staffs).

NCB's FOUR-LEGGED STOCK

FOR its East Moor herd of pedigree Ayrshire cattle, the National Coal Board has realized £20,794, an average of over £61 per beast. When Mr. Jack Rude, the American farmer who is taking over the 18 Ashington farms on lease from the board, offered to buy the whole of the dairy stock from the board at £50 apiece for the cows, his offer was refused.

The 176 cows and in-calf heifers put up for auction at last week's dispersal sale averaged £72 8s. apiece. There is one more NCB herd to be disposed of.

Scottish Power Plants to Stick by Coal

ASSURANCE that there was no intention of converting any electricity generating plants in Scotland to oil, was given at a meeting of Kirkcaldy Trades Council last week by Mr. G. T. Allcock, Fife area manager of the South of Scotland Electricity Board. Mr. Allcock was answering criticisms by National Union of Mineworkers' delegates of the 6 per cent. increase in tariffs introduced on April 1.

"It ill becomes Fife to criticize the higher tariffs," he said, "because nearly half of the increased expenditure which is causing the price rise is being spent in Fife."

Mr. Allcock said that the new generating station at Kincardine was providing work for a large number of men on construction and already 200 people were employed on the operational side. This figure would eventually increase to 600. "But its main asset to Fife is that it provides a tremendous market for coal from the neighbouring collieries. With only two of the five generating sets running, the coal consumption is over 2,000 tons a day."

With all five sets running, the station would use between 2,000,000 and 2,500,000 tons of coal a year—representing half the present output of pits in West Fife and Alloa. The Electricity Board was considering building another generating station on a site between Kirkcaldy and Leven.

Area Manager Condemns "Dismal Jimmies"

CRITICIZING the "dismal Jimmies" who held that the coal-mining industry was down and out, Mr. E. W. Lane, general manager of the No. 1 (Worksop) Area of the North-Eastern Divisional Coal Board, condemned the loose talk and ill-informed comment about the industry. He was speaking at the annual dinner of officials of Manton Colliery, Worksop.

Such talk was quite unwarranted, said Mr. Lane. It was totally impossible to visualize the relegation of coal to an inconspicuous position in the power requirements of the future.

Of Manton Colliery itself, Mr. Lane said that it was not long ago that there was an impression in certain circles that the position there was "completely hopeless." But by sheer hard work, enthusiasm, and team spirit by officials and men, the position had changed out of all recognition.

Cold Forging Process Developments

DEVELOPMENTS are announced in connection with the steel cold forging process of Camp Bird, Limited. Long-term loans totalling £500,000 have been given under the auspices of the Saar Government to a new company, Saarländische Werkzeug- u. Machinenfabrik W. Nothelfer, GmbH, in which Camp Bird holds 80 per cent. of the equity. This company will manufacture cold forged products and the machine tools and other equipment needed in steel and cold forging.

Ten acres of building land and several houses for key workers have been sold at nominal cost to the company by the municipality of Lockweiler, near Saarbrücken, where the factory will be built. Production is expected to begin before the end of the year. It is the first time that a German State has subsidized a British-controlled company.

The new Saar company will be under the joint directorship of Walther Nothelfer, managing director of A. Nothelfer u. Söhne, machine and press tool manufacturers, of Ravensburg, and Dr. Heinz Feldmann, technical director of Cold Forging, Limited. Camp Bird has a 51 per cent. controlling interest in A. Nothelfer u. Söhne and Cold Forging is a wholly-owned Camp Bird subsidiary.

Round the Clock Operation

Lockweiler will be the third plant for the manufacture of steel cold forged products established under the aegis of Camp Bird. Cold Forging now has 16 presses and related equipment operating round the clock at Sunbury-on-Thames. The Camp Bird associate company, International Cold Forging Corporation, has started production of steel cold forgings for the French motor, electrical, and plumbing industries at Le Vulcain, Monaco. Production at Sunbury is primarily for the British motor, electrical, and pipe fitting industries.

Camp Bird also announces the acquisition of a 49 per cent. interest in Caltexa Trust (Registered), owners of the world rights of the cold forging process. Previously, Camp Bird has held only the British Commonwealth rights. As part of the new agreement, the Camp Bird group will enjoy sole selling rights for the equipment, designed and controlled by Caltexa, used in the cold forging process. For these rights Camp Bird will pay £100,000 and 350,000 Camp Bird 10s. ordinary shares, subject to Stock Exchange approval.

An associate company, American Cold Forging, Inc., has been set up in the United States, and negotiations are almost complete for licensing the cold forging process or embarking on joint ventures with the US and Canadian industrial concerns. The equipment specially designed for the process and now being manufactured under the group trade name "Colforg" will be seen by the public for the first time at the Hanover Machine Tool Exhibition in September.

Prototypes of this equipment were designed and made at the Monaco, Sunbury, and Ravensburg plants, and machines are now being manufactured at Ravensburg. Production orders have also been placed on a leading British press manufacturer for machines to be sold in the United Kingdom. Complete cold forging installations are expected to be ready for sale during 1961.

Increased Traffic for South Wales Ports

TONNAGE of traffic through South Wales ports in March continued the increase shown the previous month. The total was 1,451,086 tons, an increase of about 229,000 tons on the total for the corresponding period last year. Inward traffic, which totalled 887,378 tons, rose by about 169,000 tons, and nearly half this increase was attributable to iron-ore imports which rose by 71,000 tons. Other ores imported showed an increase of 24,000 tons and iron and steel goods an increase of 10,000 tons. Imports of pitwood and mining timber dropped by 5,000 tons.

Outward traffic, totalling 563,708 tons, improved on last year's tonnage by about 60,000 tons. Coal, coke, and patent fuel exports rose by 26,000 tons and tinplate by 5,000 tons. There was a decrease of 35,000 tons in exports of iron and steel manufactures.

Total tonnages handled by the various ports so far this year (with corresponding 1959 tonnages in parentheses) are as follow: Newport, 566,740 (501,476); Cardiff, 585,078 (505,786); Barry, 341,435 (319,359); Port Talbot, 717,689 (595,243); Swansea, 1,996,627 (1,713,781); Penarth, 100,589 (114,279); Lydney, 8,212 (5,588).

Shipbuilding Merger Reports are "Pure Speculation"

REPORTS of proposals for merging shipbuilding firms are described by the Shipbuilding Conference as "pure speculation." It adds that suggestions made that there are plans for the closing down of individual shipyards are entirely without foundation.

"Moreover," the statement continues, "no proposals have been made by the industry that the Government should provide financial aid on such lines as for cotton, steel, and aviation."

The Ministry of Transport has also denied that the Government is trying to force on to the industry the kind of mergers which have taken place in the aircraft industry.

A spokesman for the Ministry said that the object of setting up the Shipbuilding Advisory Committee was to obtain advice on what could best be done to help British shipbuilding firms to improve their competitive efficiency. Nevertheless, it was possible that mergers would be considered along with many other suggestions.

Inco Opens Automated Milling Plant

AS part of its programme to counter rising costs with increased production efficiency through technological advances, the International Nickel Company of Canada, Limited, has opened a new, highly automated ore milling plant in the Sudbury area of Ontario. The mill, which cost $12,000,000 to build, makes extensive use of instrumentation to permit centralized, and in some cases, automatic, control of the crushing, grinding, flotation, and dewatering processes in the production of concentrates from ore.

All operations are controlled from centrally located instrument panels, and many recently developed techniques, including the use of radioactive isotopes for density measurements, have been incorporated into the plant. The mill will help to raise Inco's nickel production capacity to 385,000 lb. a year by 1961 and will itself have a capacity of 6,000 tons of ore a day.

ECSC Steel Output

NEW RECORD ACHIEVED IN MARCH

OUTPUT of crude steel (ingots and castings) in the European Coal and Steel Community last month rose sharply to an all-time record of 6,382,000 metric tons. This was not only about 500,000 tons more than the February figure and 1,500,000 more than in March, 1959, but the first time the Community's monthly output has exceeded 6,000,000 tons. The previous record was 5,992,000 tons in October last year. All six community countries broke previous records.

Pig-iron and ferro-alloys output in March was also a record at 4,685,000 tons, against 4,328,000 tons in February and 3,680,000 tons in March last year. The previous record was 4,416,000 tons last January. Once again, all community countries surpassed their previous records.

A report on French steel prices shows that of steel grades exported to other members of the Community, prices rose from April 1 by an average of 6 to 6½ per cent. Earlier it was stated that the average increase in all steel prices (including those for domestic sales) was 4¾ per cent. The suggested increase of 8 per cent. has not been reached and French prices are still the lowest in the Community.

Average price increase by Siemens-Martin grades was 4.2 per cent. and for quality fine sheet grades by 2½ to 3½ per cent. After the general increases it was announced that carbon fine steels would become 7 per cent. dearer, alloyed constructional steels and ball-bearing steels between 3.2 and 5.6 per cent. dearer, and rustless and fireproof steels between 0.5 and 3 per cent. dearer.

Japanese Orders Boost Canadian Minerals

MINING industry in British Columbia is being stimulated by an expanding Japanese market for base metals, iron ore, and coal. Largely through Japanese orders, mineral production in the Province was increased by 5 per cent. last year and is expected to increase even farther this year.

Last year, Japan bought less than 1,000,000 tons of iron ore, but purchases this year are expected to double. In addition, British Columbia producers have received orders for 770,000 tons of coal. Copper concentrates' shipments are steadily increasing and Japan has expressed interest in zinc and nickel. A contract for 8,000 tons of nickel concentrates has been re-negotiated over a three-year period.

Except by her firm purchase orders, Japan has given no financial help to the industry, but it is understood that the Sumitomo Shatji Haishi is considering a $7,000,000 loan to Bethlehem Copper Corporation.

A good demand is reported from the Canadian steel industry and it is likely that the situation will continue in the second quarter. Steel ingot production in the first quarter of this year was almost 25 per cent. higher than a year ago at 1,692,504 tons, compared with 1,358,903 tons. Pig-iron output also showed an advance of 20 per cent.

Shipbuilding Chief Answers the Critics

SPEAKING at Middlesbrough on Wednesday evening, Col. T. Eustace Smith, chairman and managing director of Smith's Dock Company, Limited, and president of the Shipbuilding Conference, said that British shipbuilders were not responsible for the excess shipyard facilities existing today any more than British shipowners were responsible for the excess of world shipping tonnage.

It was true that the British shipbuilding industry still had a substantial order-book, amounting to more than 4,000,000 tons gross, with an estimated value of more than £600,000,000 at the beginning of 1960. That was a high figure—higher than anything known in pre-war days—but it represented a backlog of ordering and was not a reflection of a healthy current demand for new ships.

The first of a number of disturbing features in the present situation was that the order-book was not being replenished. The second unhappy feature was the uneven spread of the existing order-book. Some firms, particularly those building tankers, were fairly well placed for the next couple of years, and some for even longer, but there were other firms who were down to their last order and in between were many with serious gaps in their building programmes.

"The basic problem today is the world-wide lack of demand for ships as a result of low freights and the large volume of laid-up tonnage combined with a very great excess of world shipbuilding capacity," Col. Smith continued. "Critics of the British shipbuilding industry have complained that capacity in this country was not increased when times were booming, but the United Kingdom concentrated on modernization of yards rather than on a large increase in capacity. Modernization was carried through with a view to increasing efficiency rather than capacity, and this policy may prove most fortunate in the days ahead when output facilities in the world may have to be drastically cut."

The impression that British shipyards were today lagging behind their foreign competitors was completely untrue. There were in the UK. yards as modern and as well equipped as any in the world, and the whole industry was backed by a research effort as great as, if not greater than, any of our competitors."

Col. Smith added: "I would remind you that the achievements of British shipbuilding should not be measured only by the tonnage launched or completed in any one year, but in terms of the annual value of its output in which it continues to lead the world."

Non-ferrous Metals

Influence of the South African Situation

IMMEDIATE outlook for copper is good—beyond that it is difficult to judge. The technical view may well be that with demand in the US running below production, supplies of the red metal will cross the Atlantic to raise stocks and lower prices. But a worsening of the South African situation could dominate the market and, what is more, if it comes to be believed that trouble may be expected in the near future from the Rhodesias and the Belgian Congo, the economics of the market will count for naught.

Copper in London is firm; concentration of demand on cash metal has put prices higher and opened up the backwardation. Indeed, the tone of the London market has improved noticeably. This is due, aside from good demand from the UK, to the US market inclining harder, continental demand coming in again after falling away last week, and to the continued uneasiness created by the South African situation.

Moreover, stocks are still dwindling and are now at that level which can almost be described as "dangerously low." Some of the demand from the Continent is for May delivery which will help counter the offer of US copper for May delivery.

There is the possibility that the "flashes in the pan" experienced in the US market from time to time might develop into a sound trend. If this happened, there would be a definite stiffening in the tone and price of the metal on both sides of the Atlantic. At present, the price of 33 cents a pound (equivalent to £264 a ton), is applicable to both producers and custom smelters.

Tin is still quiet and steady. The increased quota in the new period tended to make for a dull market at first. But this has now changed and the price is relatively stable around £788 a ton. The US market is quiet although the price has tried hard to rise above $1 a pound.

Lead in London after reaching £78 3s. 9d. a ton last week—its highest level since the end of November, 1957—has slipped back a little but is still basically a firm market. Prompt metal is relatively scarce and the price could go much higher. However, stocks in the hands of producers are high and there is no reason to believe that the price will "run away." It may be worth remembering that the Board of Trade has lead stocks amounting to 14,000 tons. In the US the market is experiencing fair trading conditions and the price remains unchanged at 12 cents a pound, equivalent to £96 a ton.

Zinc continues firm in London. Demand, after a nervous start last week, has recovered and the price is going ahead again. Turnover is good and the backwardation is widening. In the US the market is sporadic with no long term trend emerging. The price is unchanged at 13 cents a pound—equivalent to £104 a ton.

Official metal prices in London on Wednesday were:—COPPER, Standard: Prompt £266, forward £244. TIN, Standard: Prompt £787, forward £785. LEAD: Prompt £76 17s. 6d., forward £76 5s. ZINC: Prompt £92, forward £89 5s.

CHIMING CLOCKS are to be presented this month to 992 employees with 25 or more years' continuous service with the Radiation, Limited, group. These long-service employees form 9 per cent. of the total labour force and jointly represent 35,000 years of work.

Shipyard Labourers' Wage Claim

SUPPORT for an independent wage demand for about 10,000 labourers in the shipbuilding and ship-repairing industries was given on Thursday of last week by the executive of the Confederation of Shipbuilding and Engineering Unions. At a meeting in York, the executive considered a letter from the National Union of General and Municipal Workers, saying in effect that if the confederation refused to support the claim, the union would go forward on its own.

The confederation executive also dealt with unrest in the Midlands over the introduction of the 42-hour working week. When the reduced working week was accepted, the confederation agreed that the reduction should be spread evenly over existing working hours. Since then, however, some nightshift workers in the motor industry have insisted that the cut should be concentrated on the Friday shift.

On the suggestion of Mr. William Carron, president of the Amalgamated Engineering Union, the executive decided to call a meeting in York next month of the chairmen and secretaries of its 48 district committees to discuss the problem.

SEVEN CANDIDATES FOR NUM PRESIDENCY

RECORD number of candidates for the presidency of the National Union of Mineworkers have now been received. With the somewhat surprise entry by the Nottinghamshire Area of Mr. W. L. Ellis, a Communist and one of the Area's full-time agents, the total number of candidates is brought to seven. As a Communist Mr. Ellis will be contending against the strongly supported vice-president of the Scottish Area, Mr. Alex Moffat, also a Communist.

The president of the union, Mr. W. Ernest Jones, has retired this week and owing to the death of Mr. Alwyn Machen, who topped the poll in the first ballot, he has no successor until the new ballot is declared. His vice-president, Mr. Edward Jones, will carry on for the time being.

The candidates are:—Mr. W. L. Ellis (Notts), Mr. S. W. G. Ford (Clerks, London), Mr. J. Hammond (Lancs), Mr. T. Holliday (Northumberland), Mr. A. Moffat (Scotland), Mr. J. Southall (Midlands), Mr. Bert Wynn (Derbyshire).

Colvilles Issues 3,540,320 Ordinary Shares

DIRECTORS of Colvilles, Limited, have announced that 4,205 holders of convertible debenture stock exercised their conversion rights during March, 1960, in respect of £5,057,600 stock, and have accordingly issued and allotted 3,540,320 ordinary shares of £1 each. The balance of debenture stock now outstanding is £421,850, and the number of ordinary shares now in issue is 13,915,116.

Permission has been granted by London Stock Exchange to deal in an official quotation for the additional 3,540,320 ordinary shares and the necessary arrangements are being made to apply to the other exchanges which already deal in the existing 10,374,796 ordinary shares for similar permissions and quotations.

£24,000,000 PLAN

Pressed Steel's Comprehensive Expansion

LINKED with the large-scale expansion programme being undertaken by the motor-car industry, the Pressed Steel Company, Limited, announced on Thursday of last week its own major expansion programme which will involve expenditure of about £24,000,000 over the next three years. In addition to extending existing plant at Swindon, it is planned to introduce to the Linwood (Glasgow) factory large-scale body production alongside the manufacture of railway rolling stock.

The directors also plan to expand the company's capacity for the manufacture of press tools. A site for that purpose has been acquired on the Simonside Trading Estate, Jarrow, and negotiations are in progress with the Board of Trade for the construction of a factory. Part of the necessary finance will be raised by a rights issue of ordinary shares, details of which are to be announced in due course.

Net profit for 1959 advanced from £2,017,598 to £2,461,506, after tax of £2,367,579 (£2,342,779). With a final of 21 per cent., the dividend total is raised by 5 per cent. to 30 per cent.

Locomotive Order-books Full Until 1962

PRODUCTION of locomotives by the Birmingham Railway Carriage & Wagon Company, Limited, continues to expand, reports the chairman, Sir Bernard Docker, in his annual statement. In 1959, the sales value of locomotives exceeded that of the company's other products for the first time.

Locomotive order-books have been filled until early 1962, and the company is fully committed for carriages for about 12 months. Sir Bernard says he would now like to see some further carriage prospects for the following period. The wagon position still shows no indication of improving, he adds.

The valuation of fixed assets started three weeks ago and, Sir Bernard said, should be available in six or seven weeks. The board is awaiting the valuation result before making any recommendation on the merger offer from Charles Roberts & Company, Limited, rail and road vehicle builders, etc., of Wakefield. Sir Bernard states that one or two projects examined for broadening the basis of production were found not entirely suitable. The matter is, however, being energetically pursued.

As reported, profit, after tax, dropped from £102,900 to £71,508 and the dividend is reduced to 7½ (10) per cent., but there is this time a 5 per cent. tax free payment from investment sale profits.

STEPHENSON CLARKE, LIMITED, London, E.C.3, which has carried out a great deal of development work in the commercial utilization of fly ash, has been appointed sole agent to the South of Scotland Electricity Board for the commercial development and sales of fly ash outputs at the following generating stations: Braehead; Portobello; Kincardine; and Barony. Inquiries should be directed to:—Stephenson Clarke, Limited, (P. F. Ash Development), 8, Woodside Terrace, Glasgow, C.3.

Alfred Herbert Success with New Machines

SEVERAL new machines added to the range of manufactures of Alfred Herbert, Limited, machine-tool makers, of Coventry, during the year to October 31, 1959, met with immediate success, states the chairman, Col. C. W. Clark. He says that the company's present problem is to comply with the demand for these machines and certain other models enjoying an established popularity. The demand for the company's goods is such that there should be no difficulty in repeating the ordinary dividend of the previous year.

Expansion continues on the Atritor drying and pulverizing machines' side of the business, making a very useful contribution to the company's profits. Associated companies in Australia, France, and Italy continue to make satisfactory profits in view of the restricted imports which until recently limited their turnover. The position in these countries has now improved.

Group net profit for 1958-59 fell from £1,585,041 to £1,366,342, but the dividend is raised by 1 per cent. to 7 per cent., tax free, in view of the improved position. A capital bonus of ½ per cent. was also paid.

Council Claims on RTB for Road Damage

CLAIMS have been made by Monmouthshire County Council against Richard Thomas & Baldwins, Limited, and Sir Robert McAlpine & Sons, Limited, for damage to roads in the county by the "extraordinary traffic" to the site of the former company's new Spencer steelworks at Llanwern, near Newport. Sir Robert McAlpine & Sons are the contractors.

The decision to make the claims was made by the council after its Roads and Bridges Committee reported that about £9,000 extra had been spent on road maintenance in the county since the work on the steelworks began.

It is also learned that RTB has agreed to make a contribution to Newport Town Council to cover the cost of providing additional road access to the Spencer steelworks by next August. This move has been made because the time needed to get a grant from the Ministry of Transport would be too long to enable the work to be completed in time.

SHANKS & COMPANY, LIMITED—Mr. S. L. Elliott has joined the board.

Personal

Sir Peter Beauchamp Relinquishes NCB Post

FOR personal family reasons Sir PETER BEAUCHAMP, at present deputy marketing director of the South Western Divisional Coal Board, has asked to be allowed to relinquish his appointment.

The board has acceded to this request with regret, but states that in the near future, Sir Peter will take up an important appointment with the Coal Board's regional sales office at Derbyshire House, London.

SIR PETER BEAUCHAMP

Mr. PETER EDWARDS, a director of Smith's Dock Company, Limited, Middlesbrough, has been appointed a magistrate for the North Riding of Yorkshire.

Mr. LEONARD P. LEE, chairman and managing director of Coventry Climax Engines, Limited, has been installed as the new president of Coventry Chamber of Commerce.

Cllr. GEOFFREY FELL, joint managing director of Robert Fell & Sons, Limited, sheet lead and lead pipe makers, of Skipton (Yorks), has been elected an alderman of Keighley Town Council.

The British Rubber & Resin Adhesive Manufacturers' Association has elected Mr. N. G. BASSETT SMITH, of the Dunlop Rubber Company, Limited, chairman and Dr. H. SIMON, of Evode, Limited, vice-chairman for the year 1960-61.

Mr. H. M. IRWIN, a director of William Dickinson & Company, Limited, exporters of steel products, coal, etc., of Newcastle-upon-Tyne, is undertaking an extensive tour of the company's agents in the USA, Canada, New Zealand, and Australia at the end of the month.

Mr. HARRY ARMSTRONG, 44-year-old Lecturer in Mining at Nuneaton Technical College, is leaving to take up a post as agent for the Rewa Coalfields in Central India. He began his mining career at Haunchwood Colliery, Nuneaton, but worked in India from 1951 to 1956.

Mrs. N. C. MACDIARMID, wife of the managing director of the Stanton Ironworks Company, Limited, near Nottingham, and president of the company's girls' club, presided at the distribution of Duke of Edinburgh awards recently to 26 girls and seven boys from the company.

New president of the Leicester Association of Engineers is Mr. R. S. LOMAX, director and works manager of Ashwell & Nesbitt, Limited, heating and ventilation engineers, etc., of Leicester. Mr. Lomax has been a member of the council of the association since 1954. He became vice-president in 1956.

The Association of Light Alloy Refiners and Smelters, Limited, has elected Mr. W. W. LEE, Enfield Rolling Mills (Aluminium), Limited, chairman, and Mr. R. HAHN, B.K.L. Alloys, Limited, vice-chairman for the year. In addition to the chairman and vice-chairman, the council of management for the year consists of the following:— Mr. F. FARENDEN, Eyre Smelting Company, Limited, Dr. J. JAKOBI, International Alloys, Limited, Mr. L. A. JARVIS, Wigley Aluminium, Limited, and Mr. P. WARD, John Dale, Limited.

Recently elected officers of the Light Edge Tool and Allied Trades Association include:—Mr. A. HATTERSLEY, Ward & Payne, Limited, Sheffield, chairman; Mr. J. J. JEWITT, Thos. R. Ellin (Footprint Works), Limited, Sheffield, vice-chairman; and Mr. STUART DAVIDSON, Robert Sorby & Sons, Limited, Sheffield, treasurer.

Tees-side branch of the Institute of British Foundrymen has elected Mr. F. W. POTTS, works manager of Cochranes (Middlesbro') Foundry, Limited, as president, Mr. T. HURST, of the Darlington Forge, Limited, senior vice-president, and Mr. G. F. TAYLOR, a director of Head Wrightson Steel Foundries, Limited, junior vice-president.

After 50 years in the mining industry, Cllr. ERNEST WAITE, Deputy Mayor of Nuneaton and training officer at Griff Colliery, Nuneaton, has retired at the age of 65. He has worked at Griff Colliery for the past 25 years. Cllr. Waite has been a member of Nuneaton Borough Council for 13 years and is also a member of Warwickshire County Council.

Sir GEORGE EDWARDS, a director of Vickers-Armstrongs, Limited, and managing director of Vickers-Armstrongs (Aircraft), Limited, was, on Thursday of last week, awarded the Daniel Guggenheim Medal for achievements in the advancement of aviation. The award was made by the National Aeronautic Meeting of the Society of Automotive Engineers.

A gold watch has been presented to Mr. JOHN COOPER to mark the completion of 50 years' service with David Brown & Sons (Huddersfield), Limited. Mr. Cooper was for some time in charge of all plant at the group's Park Works, moving in 1941 to Meltham to take charge of machine tool maintenance, and for the past year he has concentrated on special projects and exhibition work.

Dr. DAVID H. FOLLETT, keeper of the Department of Electrical Engineering and Communications in the Science Museum, is to succeed Dr. T. C. S. Morrison-Scott as director of the museum on May 1. Dr. Follett, who joined the museum in 1937, was previously with Adam Hilger, Limited, optical instrument makers, where he worked on the application of photo-electric methods of spectrophotometry.

SCOW Benefits from New Marshalling Yard

MARSHALLING yard with the highest degree of automatic control in Britain was opened at Margam (Glam) on Monday by Mr. K. W. C. Grand, a member of the British Transport Commission. The yard, which cost £2,500,000, was built by the Western Region of British Railways and designed in close co-operation with the Steel Company of Wales, Limited, to cater for its requirements.

There are 12 reception sidings with engine release road and engine return road; 48 sorting sidings, with cripple and brake van sidings; and 10 storage sidings. Fifteen of the sidings have been allocated for the use of SCOW. Points are automatically set by a coded tape and the amount of braking to be applied by the fixed retarders is worked out by a computer. Other features include a two-way radio telephone, one-way portable radio transmitters, and two-way loudspeakers and microphones.

SELF-FLUXING SINTER

Experimental Production for Italian Blast Furnaces

By Dr.-Ing. G. SIRONI*

The Finsider group, which is responsible for the greater part of the Italian pig-iron output, uses sinter—generally acid—to the extent of 50 to 70 per cent. of the iron burden. In this paper Dr.-Ing. G. Sironi describes tests carried out on an experimental sinter pan at the laboratories of the research institute of the group to produce fluxed sinter at various basicity ratios and ascertain their properties.

SELF-FLUXING sinter in burden is a means for reducing coke consumption and increasing pig-iron production. During recent years, the self-fluxing sinter technique has expanded rapidly, being widely used in the USSR, where a great part of the total sinter is fluxed, and in Sweden. Some interesting applications can also be found in Canada, Great Britain, Japan, and the US.

In Italy, the Finsider group, which shares some 70 per cent. in the country's pig-iron production, relies on the quality of ores and the good preparation of the blast-furnace burdens, as ways for keeping costs competitive. It is important to keep in mind that the group imports about 80 per cent. of the iron ores and nearly all of the fuel, either as coking coal or as coke. In the laboratories of the Istituto Siderurgico Finsider, the research institute of the group, tests were carried out on an experimental sinter pan having an area of 1.74 sq. ft., in order to produce fluxed sinter at various basicity ratios and ascertain its technological properties.

The data so obtained would be useful for planning the future operational programme of blast furnaces and sinter plants. The experiments began from a mixture representative of the mixtures sintered in that period:—Goa ore, 13 per cent.; Venezuelan ore, 23 per cent.; pyrite cinders, 17 per cent.; Elba ore, 14 per cent.; roasted siderite, 6 per cent.; rolling scale, 5 per cent.; OH slag, 5 per cent.; flue dust, 17 per cent.

The mixture has the chemical composition:

Fe	SiO_2	Al_2O_3	CaO	MgO	S	Mn
51.19	8.37	4.10	4.20	2.50	0.675	0.76

Experimental Procedure

For the various experimental tests the following conditions of the full-scale sinter plant were reproduced:—

Depth of the feed: 30 cm. (11.8 in.), of which 3 cm. (1.2 in.) was hearth layer.

Sintering suction: 700 mm. H_2O (27.5 in. w.g.).

Return fines: 20 parts every 100 of ores and flux.

Limestone, ground to range size 0-3 mm. (0-$\frac{1}{8}$ in.), as flux was used.

Sinters were obtained having basicity ratios CaO/SiO_2 between 0.52 (no limestone in mixture) and 2.17 (about 25 per cent. of limestone in mixture). Such wide range of the basicity ratio was tried out in order to have practical indications for suitable industrial alternatives.

Sinter in the blast furnaces of the Finsider group represents, in fact, 50 to 70 per cent. of the iron burdens. The sinter is generally acid. The basicity ratio of blast-furnace slag is 1.20 to 1.25. For a fluxed burden three solutions may be considered: (*a*) Partially fluxed sinter; only a part of the limestone related to sinter is replaced; (*b*) sinter having a basicity ratio of the same value as blast-furnace slag: all the limestone related to sinter is replaced; and (*c*) sinter having a high basicity ratio in order to entirely replace in the furnace the limestone related to sinter, iron ore, and coke ash.

These solutions require progressively higher sinter basicity: hence the importance of knowing the characteristics of sinter at various basicity ratios (production, size distribution, mechanical strength, reducibility, etc.).

Results of the Experiment

The introduction of ground limestone in sinter mixture has no sensible effect on the permeability of the sintering layer before ignition. The sintering time decreases in proportion with the basicity of the mixture (Fig. 1); therefore, in spite of the higher loss of weight due to the decarbonation of limestone, the sinter output is of the same order whatever the basicity ratios.

At each basicity ratio, mixtures with a content

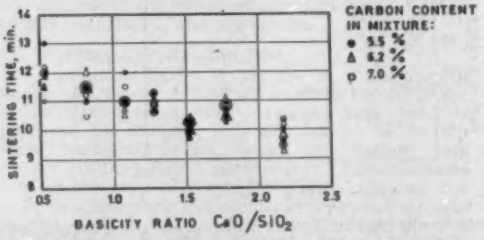


FIG. 1.—EFFECT OF SINTER BASICITY ON SINTERING RATE.

* Istituto Siderurgico Finsider, Genoa (Italy).

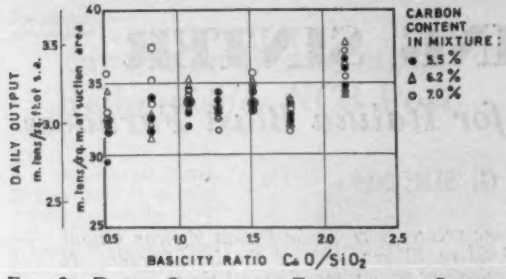

DAILY OUTPUT m. tons/sq. m. of suction area
m. tons/sq. m. of suction area/hr
BASICITY RATIO CaO/SiO2
CARBON CONTENT IN MIXTURE:
● 5.5 %
Δ 6.2 %
○ 7.0 %

FIG. 2.—DAILY OUTPUT AS FUNCTION OF SINTER BASICITY.

of 5.5, 6.2, and 7.0 per cent. of carbon (flue dust carbon included) were tested, but no sure influence of such carbon contents in the mixture on the production of fluxed sinters was ascertained (Fig. 2).

Chemical composition of fluxed sinters is given in Table I.

TABLE 1.—*Percentage Chemical Composition of Fluxed Sinters.*

$\frac{CaO}{SiO_2}$	Fe.	CaO.	SiO_2.	MgO.	Al_2O_3	Mn.	S.
0.52	56.49	4.62	8.95	3.00	2.80	0.95	0.017
0.81	54.24	7.23	8.92	2.77	3.03	0.91	0.029
1.09	53.78	9.47	8.70	2.82	2.47	0.95	0.041
1.28	52.55	11.02	8.63	3.17	2.54	0.92	0.072
1.51	50.80	13.22	8.75	2.61	2.05	0.90	0.085
1.77	49.56	15.11	8.55	2.79	2.10	0.87	0.111
2.17	46.80	18.78	8.63	2.48	2.60	0.91	0.149

Size Distribution of Sinters

The effects of the basicity on the percentage of the two main size ranges for two series of sinters (5.5 and 7.0 per cent. of carbon) are shown in Fig. 3. To the increased basicity ratio (from 0.5 to 0.8) corresponds an increased size distribution; at a higher basicity ratio, the size of the sinter decreases considerably.

Fluxed sinters indeed have a median size smaller than the acid but the size distribution is more concentrated. The return fines increase in relation to the basicity ratio from 20 to 25 per cent.

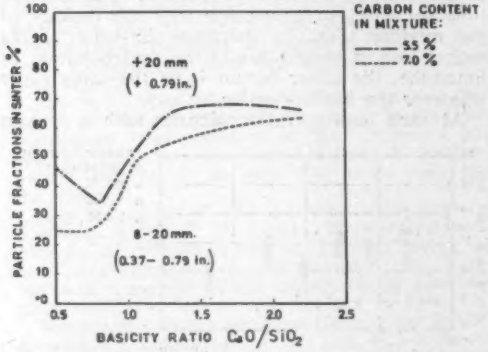


FIG. 3.—EFFECT OF SINTER BASICITY ON THE PERCENTAGE OF THE TWO MAIN SIZE RANGES OF THE SINTER.

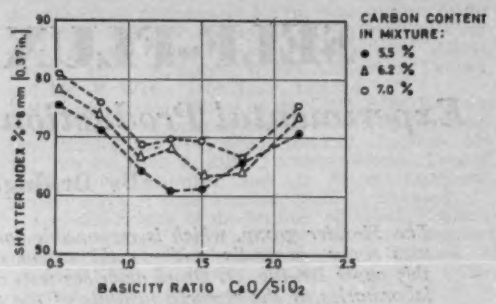


FIG. 4.—EFFECT OF SINTER BASICITY ON THE MECHANICAL STRENGTH OF THE SINTER (EACH POINT REPRESENTS THE MEAN OF SIX DATA).

The results of the shatter tests (four drops from a height of 2 m. (6 ft. 7 in.) for 10 kg. (22 lb.) blast-furnace sinter) are shown in Fig. 4. Mechanical strength has a minimum for sinters having basicity ratios near 1.5. For higher basicity ratios the sinters have a marked increase in strength.

Reducibility of Sinters

The tests were carried out in stream of hydrogen 1,000 litre/hr. (35.3 cub. ft./hr.) at a temperature of 850 deg. C. The weight of the sample: 500 gm. (1.1 lb.); the size distribution of the sinter was 8 to 10 mm. ($\frac{1}{3}$ to $\frac{3}{8}$ in.)

As a reducibility index t_{90} was assumed (time in minutes for the 90 per cent. of the total reduction obtainable under such conditions).

The results for two series of sinters, obtained from mixtures having different carbon contents, prove that the higher the basicity ratio of sinter, the better its reducibility, but also the importance of the carbon content in the mixture was confirmed

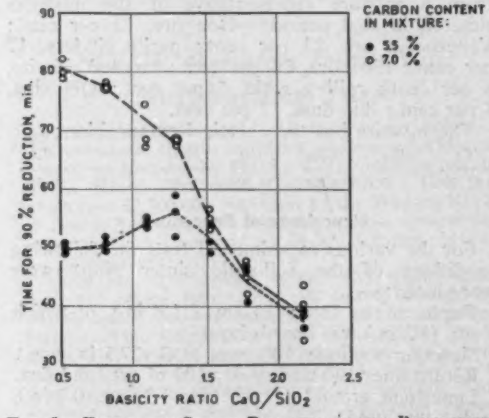


FIG. 5.—EFFECT OF SINTER BASICITY ON THE REDUCTION TIME OF THE SINTER.

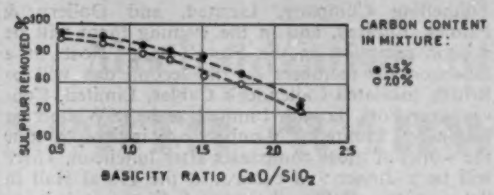


FIG. 6.—EFFECT OF SINTER BASICITY ON THE REMOVAL OF THE SULPHUR DURING SINTERING (EACH POINT REPRESENTS THE MEAN OF SIX DATA).

(Fig. 5). In fact, the reduction time (t_{90} index) for the sinters included in the range of

$$\frac{CaO}{SiO_2} = 0.5 \text{ to } 1.3$$

increased remarkably in connection with the carbon content of the mixture. A careful control of the carbon in the mixture is, in this range of basicity, very important for getting good reducibility sinter.

For an enhanced basicity of the sinter

$$\frac{CaO}{SiO_2} > 1.3$$

the influence of the carbon content on reducibility is weaker.

Sulphur Elimination

Removal of the most part of the sulphur during sintering is particularly important in Italian blast-furnace practice because of the small volume of slag due to the use of high-grade foreign ores (slag volume 10 cwt./m. ton pig-iron to 98 cwt./m. ton pig-iron). The influence of carbon content in the mixture and basicity of the sinter was investigated.

In accordance with theoretical considerations about the chemical mechanism of sulphur removal[1] and the results of many experimental works[2,3], the tests confirmed that the higher the basicity of the sinter, the greater the amount of sulphur retained by the sinter. However, the removal of sulphur is about 90 per cent. in correspondence to a basicity ratio of 1.25 (Fig. 6).

The increased amount of the carbon content in the mixtures makes the removal of sulphur worse. The amounts of the sulphur retained by the various fluxed sinters are shown in Fig. 7.

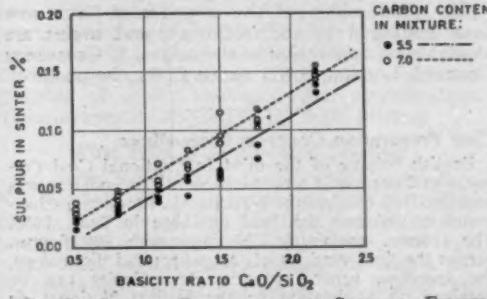


FIG. 7.—SULPHUR RETAINED BY THE SINTER AS FUNCTION OF ITS BASICITY.

Conclusions

A sinter mixture similar to the one used in some Italian industrial plants was tested at various basicity ratios. Such tests showed that:

(1) The sinter output is of the same order at various basicity ratios; the coke consumption is similar to the one of acid mixture. Only for mixtures having a basicity ratio greater than 1.5 a certain increase in coke addition is advisable, for example, from 5.5 to 6.5 per cent. of carbon content.

(2) Mechanical strength and size distribution of fluxed sinters are favourably affected by increasing coke content, but the influence of basicity is deeper, so that the relation strength/basicity has a particular shape having a minimum in correspondence of

$$\frac{CaO}{SiO_2} = 1.5.$$

(3) Gradual additions of limestone in the mixtures lead to sinters having better reducibility. The reducibility of semi-acid and low-basicity sinters is noticeably influenced by carbon content. Therefore a careful control of coke is necessary in order to avoid the loss of reducibility gained by the increased basicity.

(4) Increased basicity and carbon content affect inversely the removal of the sulphur during sintering. Still, if the content of fuel is properly proportioned for a basicity ratio of 1.25 (that corresponds to the basicity ratio of the blast-furnace slag) even 90 per cent. of sulphur is removed.

REFERENCES

[1] V. Giedroyc, *JISI*, **180**, June, 1955, pp. 129-139.
[2] B. G. Baldwin and L. F. Burgess, Report of Second Symposium of Sinter, Paris, 1957, **1**, pp. 61-81.
[3] G. Turpin and M. Auxefans, Report of Second Symposium of Sinter, Paris, 1957, **1**, pp. 82-94.

Symposium on Gas Plant Protection

Joint symposium sponsored by the Institution of Gas Engineers, the Society of Chemical Industry Corrosion Group, and the College of Advanced Technology, Birmingham, is to be held in Birmingham on September 22 and 23 next on "The Protection of Gas Plant and Equipment from Corrosion." It is hoped that the symposium will be of value, not only to those engaged in the manufacture, distribution, and utilization of town gas, but to the manufacturers and users of plant, ancillary equipment, and appliances.

New Welding Specification List

Full technical details of all the 34 different rods and the 18 types of flux which comprise the Sifbronze oxy-acetylene welding range, together with ancillary equipment, are provided in a new edition of the Sifbronze specification list, issued by Suffolk Iron Foundry (1920), Limited, Stowmarket. Particulars are given on the type of work for which each rod and flux is designed, their mechanical and physical properties, and method of use. Also described are the new rods, Sifbronze 101 and flux-coated 104.

June 1–3

Colliery Managers' Conference

"CHALLENGE of Change" is the theme of the 1960 conference of the National Association of Colliery Managers, which will be largely devoted to an examination of the National Coal Board's "Revised Plan for Coal." How the challenge is being met, and what colliery managers can do to assist in winning anew the battle for coal, will be demonstrated in the technical sessions.

MR. H. E. TYSON

Southport, the famous resort on the Lancashire coast, has been chosen for the conference, and members will meet at the Palace Hotel there on the morning of June 1 for the official opening by the mayor. The association's annual general meeting, which will include the election of president and hon. treasurer for 1960-61 and an address by the retiring president, Mr. H. E. Tyson, will follow the opening of the conference.

Address by Sir James Bowman

The programme of technical sessions will include papers by members of the NCB and the board's departmental directors, and there will be an address by Sir James Bowman, chairman of the NCB, at the concluding session on June 3, when Mr. Tyson will be in the chair.

Titles of the various papers and their contributors are as follow:—"Introduction on the Revised Plan for Coal," by Mr. W. V. Sheppard, director-general of reconstruction, NCB; "The Technical and Economic Implications of the Plan," by Mr. H. A. Longden, director-general of production, NCB; "The Importance of Natural Carbon Deposits," by Mr. H. E. Collins, production member of the NCB; "Manpower and Social Consequences of the Plan," by Mr. J. Crawford, industrial relations member of the NCB; "Financial Problems of the Coal-mining Industry," by Mr. H. W. Hembry, finance member of the NCB; "Marketing Implications of the Revised Plan," by Mr. R. H. E. Thomas, marketing member of the NCB.

A full social programme for members and their ladies has been arranged in connection with the conference. On the opening day members will be the guests at a luncheon given by the Associated Tunnelling Company, Limited, and Dollery & Palmer, Limited, and in the evening there will be a civic reception in the Floral Hall. Hosts at a luncheon for members on the second day will be British Insulated Callender's Cables, Limited, Conveyancer Fork Trucks, Limited, and the Whitecross Company, Limited. Members are invited to tour the works of those companies after luncheon. There will be a dinner and cabaret at the Floral Hall in the evening. Before the annual dinner and dance at the Floral Hall on the last day, members, with their ladies and guests, are invited to take cocktails with the belting division of the Dunlop Rubber Company, Limited.

The competition for the Commodore King Golf Trophy will be held on the last day of the conference at the Hesketh club; competitors will be the guests of Samuel Marsden & Son, Limited, at luncheon. The cup will be awarded for the best return on a medal round (over 18 holes).

Coach tours, visits to factories, and other events have been planned for the ladies, who will be entertained at luncheon and tea during the conference.

Shaft Sinking and Tunnelling

IN recent years the coal-producing countries of Europe have been modernizing existing collieries and developing new mines in order to raise capacity and improve efficiency of the coal-mining industry. During this period there has been free exchange of technical information between the various countries, achieved mainly through international technical conferences and reciprocal visits to coalfields in Europe and elsewhere.

The International Symposium on Shaft Sinking and Tunnelling organized in July, 1959, arranged by the Institution of Mining Engineers, made an outstanding contribution to this interchange of ideas. Authors of international repute from 14 countries presented 25 papers, embodying wide experience of various methods designed to meet different geological conditions. The assembly of this technical information in a single volume provides a valuable work of reference on shaft-sinking and tunnelling practice.

The proceedings of the symposium have now been published by the institution and copies are available on application at the offices, 3, Grosvenor Crescent, London, S.W.1 (price £3 2s., by post).

Coal Preparation Congress Proceedings

English volume of the third International Coal Preparation Congress is now available. The congress was organized by the Institut National de l'Industrie Charbonnière (Inichar) and held at Liège in June, 1958. The volume, containing 790 pages with 700 figures, carries the final versions of the papers and discussions, the speeches, general reports, etc. Copies can be obtained on application to the Institut National de l'Industrie Charbonnière. Liège (Belgium), 7, boulevard Frère-Orban (price 60 Belgian francs).

Mechanization of a Thin Seam at NORTH WARWICK COLLIERY

By S. PITCHFORD, M.I.Min.E.

Mechanization of thin seams, especially those which are approaching exhaustion, is often financially impracticable. In this paper, presented to the South Staffordshire, Warwickshire, Worcestershire, and Shropshire Branch of the National Association of Colliery Managers on November 26, 1959, the author describes the introduction of a low capital-cost project in a seam with a working height of 26 in., involving the use of flight loaders, and subsequently the Huwood ML 6 hydraulic loader. Operational efficiency and size of the product with the ML 6 are compared favourably with the results obtained by hand loading.

THE High Main Seam at North Warwick Colliery is 2 ft. to 2 ft. 3 in. thick, and lies at a depth of 120 yd. from the surface. The main entry and transport road for coal is by means of a 1 in 4 drift from the Bench winding level 90 yd. below. All High Main coals are conveyed down the drift to a loading point 100 yd. from the No. 1 coal-winding shaft.

Materials are sent into the pit via the No. 2 shaft and transported inbye by rope haulages in the return airway. Fig. 1 shows the general layout of the workings.

The seam is overlain by a band of grey bind, varying from 6 in. to 12 in. thick, above which is 18 ft. of sandstone. The floor, consisting of fireclay to a depth of 3 ft., is subject to considerable heave, and deteriorates quickly in the presence of water. Fig. 2 shows a section of the strata described.

From the time the seam had been first worked, conventional methods have been followed, *i.e.*, machine cutting and hand filling on to bottom-belt conveyors, a fairly consistent 2,500 ton/week, at a face o.m.s. of 75 cwt. being obtained. This o.m.s. was 15 cwt. less than the average for the pit, and some ready means of improving productivity was therefore sought.

The greater part of the seam in this area had been worked, leaving a working life of only three years. This, together with the seam thickness, the comparatively short life of the individual faces, and considerations of capital cost, ruled out most methods of power loading. After consideration, it was eventually decided to try flight loading.

First Trial of Mechanized Loading

To carry out the experiment, a single-unit face, No. 8 panel, 140 yd. in length was selected. The system first adopted on this face was on conventional flight-loading lines. A 70-h.p. AB coal cutter fitted with an under-cutting jib, with a 6-7-in. mushroom turret, was cut in the fireclay just below the seam, the gummings being thrown into the waste by a gumstower attachment. Dirt cutting arose because of the excessive heave of the fireclay floor.

On the completion of cutting into the stable at the return end of the face, flight-loading equipment was fitted to the machine, and loading commenced on the return run. The stable was kept a web in advance of the face, and was hand loaded after being undercut by an AB 50-h.p. coal cutter. This machine was found to be underpowered for cutting and gumstowing the whole face, hence the need for the other machine to both cut and load. The face conveyor used was a standard Huwood SL3 bottom-belt unit, with 20-in. wide belt. The support system was similar to that employed on orthodox faces, 6-ft. 6-in. steel bars being set on wood props to give a 2-ft. 6-in. cutter track. The wastes were caved as an experiment, with "Gofar" chocks set at 6-ft. intervals behind the conveyor, to form a strong breaking-off line.

Once flight loading commenced, it was soon realized that a higher mushroom attachment was needed to get adequate preparation of the coal for loading.

A turret, 18 in. high, was found to be the ideal size for this purpose. At this stage the drawback of losing the mushroom coal cuttings was not rated too highly, as it was hoped that eventually the higher rate of advance might counter the floor heave, and enable the whole cutting operation to be carried out in coal.

It was found that the heavy duty imposed on the 70-h.p. coal cutter, of first cutting the face and gumstowing, and then loading out the coal, was causing excessive maintenance work, and also delays, and so when another 70-h.p. machine became available, this was substituted for the 50-h.p. stable machine, with the aim of using one machine for coal cutting, and one for loading out, and for a short time this course was followed.

The next step was to equip both machines for coal loading, the machines then cutting from the ends to the middle of the face, the coal-cutter men working each machine in turn. The loader team,

* Group manager, No. 4 (Warwickshire) Area, West Midlands Divisional Coal Board.

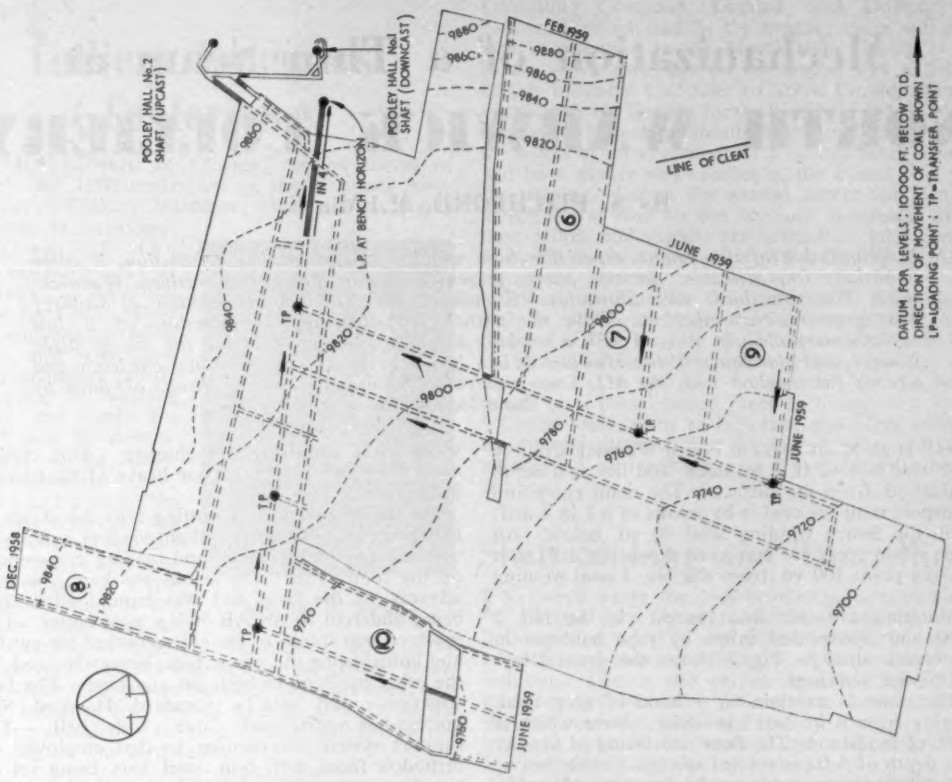


FIG. 1.—WORKINGS IN HIGH MAIN SEAM AT NORTH WARWICK COLLIERY.

again with each machine in turn, loaded out the coal, working from the middle of the face to the ends. This method eliminated the need for forward stables and for machine turning. One machine, however, had to be backed to couple up the cutting, and the ends had to be filled out by hand.

Later a setback occurred, water beginning to percolate from the roof in the waste, and though small in quantity, quickly affected the already weak fireclay floor.

The effects were cumulative as the props rapidly penetrated the floor and roof breaks followed in the face track through which more water penetrated. It was decided to revert to strip packing, and a system of 3-yd. packs and 5-yd. wastes was adopted. By arrangement with the workmen and a revision of tasks, this was accomplished with one additional man only.

Operational Results

Strip packing proved to be the answer to the trouble, and conditions quickly reverted to normal, with operational results comparing with those obtained before the water trouble.

Results were encouraging, as can be seen by the figures given in Table 1. These figures, for a six-week period in each case, are fairly representative of the results obtained from each system. The average improvements for the period gave an

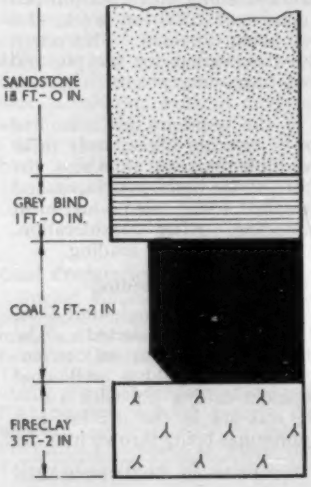


FIG. 2.—SECTION OF STRATA SURROUNDING THE HIGH MAIN SEAM.

increase in the o.m.s. of 19 cwt., and a reduction in the face wages cost of 3s. 4d./ton. The best weekly operation of the flight loader during the seven months gave an overall face o.m.s. of 99.3 cwt.

TABLE 1.—*Flight Loading on No. 8 Panel compared with Hand Loading.*

Hand loading.		Flight loading.	
Week ended.	O.m.s. (cwt.).	Week ended.	O.m.s. (cwt.).
November 9, 1957 ..	63.3	June 7, 1958 ..	92.0
November 16, 1957 ..	64.9	June 14, 1958 ..	90.0
November 23, 1957 ..	62.8	June 21, 1958 ..	86.0
November 30, 1957 ..	70.6	June 28, 1958 ..	92.0
December 7, 1957 ..	73.2	July 5, 1958 ..	90.0
December 14, 1957 ..	75.1	July 12, 1958 ..	72.0*
Average	67.7	Average	86.7

* Roof troubles due to water percolating through goaf.

The main snags encountered on this installation were the difficulties in coal preparation to give reasonable sizing, the coal being hard *in situ* and yet friable once mined. A major drawback with the machine was that any large pieces in front caused a blockage above the path of the flights and stopped the progress of the machine. Breaking these lumps was difficult, owing to the low seam thickness, and caused much delay.

Change to ML6 Loading

Flight loading having been proved to be fairly successful and enthusiastically accepted by officials and workmen, efforts were made to obtain a Huwood ML6 hydraulic loader, as it was felt that such a machine would give better sized coal and would eliminate some of the snags experienced with the adapted coal cutters. A machine was delivered in August, 1958, and was installed at No. 9 face, another single-unit face of 160 yd. in length.

From the start, results came up to expectations, and the face o.m.s. soon passed 100 cwt. It was decided to extend the system to other faces, and two further machines were obtained in the following November and put to work at No. 7 face, a double-unit panel 250 yd. long. With one machine held as a spare to permit overhauls as and when required, three machines have since been operated.

The attraction of the ML6 loader (Fig. 3) to management was:—(*a*) Low capital cost; (*b*) the gentle action of the loading arms; (*c*) the manœuvrability of the hydraulic propulsion gear, and (*d*) the quietness of operation. The hydraulic pressure is set at 650 lb./sq. in. and, in operation, the two jack posts exert an anchoring pressure of 6 tons to the roof.

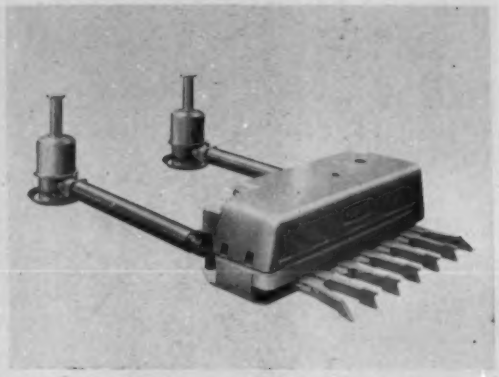


FIG. 3.—THE HUWOOD ML6 LOADER.

Each of the rams in forward extension exerts a pressure of 1¼ tons, and when retracting, either for manœuvring the machine or pulling forward the jack posts, the thrust is ¼ ton each.

A complete cycle of operations, *i.e.*, jacks up, rams forward, jacks down, and rams retract, takes 60 sec., during which the machine can travel 3 ft. 8 in. The actual loading/advance speed of the machine is, of course, governed by several additional factors, including the amount of, and preparation of, the coal to be loaded and the speed of setting the roof supports.

Description of Loader Face

For the purpose of description, a single-unit face is given as a typical example, Fig. 4 showing the system of support and general layout of the unit. The face supports are rigid steel props and 6-ft. 6-in. steel straps, the bars being set at 4-ft. intervals along the face, and the rows of props 4 ft. apart, leaving a 2-ft. 6-in. cutter track. Roadside packs are 4 yd. on the rib and 6 yd. on the waste side. As on the original flight-loader face, waste packs

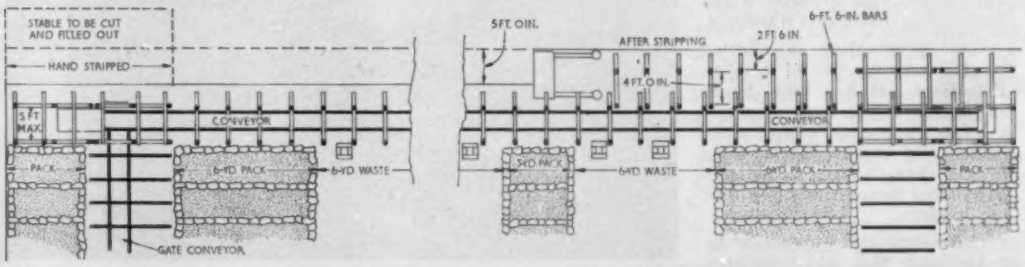


FIG. 4.—SUPPORT SYSTEM AND GENERAL LAYOUT OF A SINGLE-UNIT FACE EQUIPPED WITH A HUWOOD ML6 LOADER.

FIG. 5.—COAL CUTTER WITH 5-FT. JIB AND 18-IN. TURRET.

are 3 yd. with wastes of 5 yd. in length, and two "Gofar" chocks are set at each waste edge.

Coal cutting to an effective advance of 5 ft. per cut is by an AB 70-h.p. machine, fitted with gum-stower, gummer bar, and 18-in. mushroom turret (Fig. 5). Loading is carried out by an ML6 loader. Because of the additional depth of cut, deflector plates had to be designed to fit the loader (designed for a 4-ft. 6-in. cut) in order to place the coal on to the face conveyor.

Stables are provided at each end of the face, these being filled out by the stable men. To eliminate the need for separate coal-cutting machines for the stables, a double web is filled out of each of the stables on alternate days, the first cut being put on by the coal-cutting team, and the second by the stable men themselves. Stable working is thus always carried out in the end towards which the loading machine is travelling.

Coal preparation is effected by the use of special Cardox B20 shells, 2 ft. 3 in. long. Holes are drilled at 6-ft. intervals along the face, but usually only alternate holes need charging and firing. Fig. 6 shows the prepared coal immediately ahead of the loader.

Face transport of coal is by a Huwood SL3 20-in. bottom-belt face conveyor, delivering on to a GTB/40 belt conveyor in the main gate.

Electrical Layout

The layout of the electrical equipment is shown in Fig. 7. Electricity is supplied at 6,600 V to two transformers of 150 kVA and 100 kVA capacity, which supply current at 550 V to the district face machinery and gate conveyors. The supply is adequate to meet all demands likely to be made by the power units installed. Switches are so provided to allow the operation of both the cutter and the loader from each gate. This is necessary to ensure that the loader trailing cable has never to be dragged in front of the machine; this being impracticable owing to the low seam height and the prepared coal in the path of the machine.

This system provides for the cutting machine, when starting from one end of the face, to use the cutter panel at the opposite end, the cable being dragged by hand in front of the machine and eventually coiled at the finishing end of the face. The ML6 loader uses the appropriate panel at the starting end of the face; the trailer cable being dragged behind the machine by means of a special clamp attachment. The cable, at the finish of the loading operation, is then in position down the face ready for use by the coal cutter on the return

FIG. 6.—PREPARED COAL IN FRONT OF LOADING MACHINE.

journey. The handling of trailing cables is reduced to a minimum by this method.

Manpower with ML6 Loader

The face team work on an "all-in" contract basis, all face piece-work operations being included. The agreement provides for a basic rate with an initial fixed bonus for completion of task, and a secondary incentive bonus for team o.m.s. in excess of an agreed "norm." Table 2 gives the manpower agreed with the union to deal with the tasks covered by the contract.

TABLE 2.—*Agreed Manpower to Cover the Tasks of the Contract.*

Function.	Manpower.
Loader team	4
Coal-cutters	3
Packs and wastes	6
Conveyor men	2
Stable men	3
Borer	1
Rippers (two gates)	5
Total	24

While the above are the agreed numbers for the various operations, all grades work on a team basis and assist in the different operations so far as is practicable. In addition to the "all-in" contract team, the following also work on the face:—Shotfirers, 2; dinting roadhead and extend gate belt, 2; switch attendants, 2; general faceworker, 1. These make a total of 31 faceworkers.

Experiences with the Loader

The change from flight loading to the first ML6 machine involved no great difficulties, as the team had gained valuable experience with the former method of working. Once the system of controls had been explained and mastered, the main difference was that the new machine was easier to operate.

Earlier, the machine showed tendencies of digging into the soft floor, and to correct this flat plates were welded to the underside of the leading ends of the loader flights in the hope that the increased bearing area thus obtained would keep the flights at floor level. This was not very successful, but it was eventually found that a simple form of steel wedge, 1 ft. 6 in. long and tapered from 2 in. to a point, would level the machine quite easily if it began to "nose" down. When "nosing" commences the machine is retracted 18 in., the wedge placed centrally with the point under the loader, and forward loading recommenced. The machine quite readily lifts to a level position.

One of the faces passed over an area where the Smithy Seam, 18 ft. below the High Main, had been worked many years previously. Bad conditions resulted because of this, the floor being extremely unreliable with large cavities at times being present. The latter required girders and covering materials placing to carry the machine and form a support base for the jack posts. When roof control is lost in this seam the bind follows the coal, and the sandstone, of a "short" nature, tends to break into large blocks, which can cause considerable trouble.

Under such conditions, the loader team, on approaching such a place, would often temporarily revert to hand filling and, after supporting the place, would flit the machine through.

In the worst circumstances, where pre-shift examination had shown it to be necessary, these places would be filled off and supported by additional labour. These difficulties caused a reduction in productivity, as can be seen from the table of results, but, even so, results were better than those from the hand-filled face in the same seam.

Lumps of coal, in front of the machine (Fig. 6), occasionally "bridged" above the path of the flights and blocked the passage of the loader. The action of retracting the loader usually caused the blocked coals to drop down to the loading horizon, but considerable delay could be caused by these stops for retraction. The colliery staff tried out the idea of fitting extensions to the flights, and by experiment it was found that 4-in. vertical triangular extensions to the second and sixth flights could keep the loading reasonably clear of the blockages previously experienced. Fig. 8 shows the details of these extensions.

The side deflector plate adaption made to the loader to allow for the increased depth of cut were simple gusseted plates, drilled for attachment by

FIG. 7.—ELECTRICAL LAYOUT OF FACE EQUIPPED WITH ML6 LOADER AT NORTH WARWICK COLLIERY.

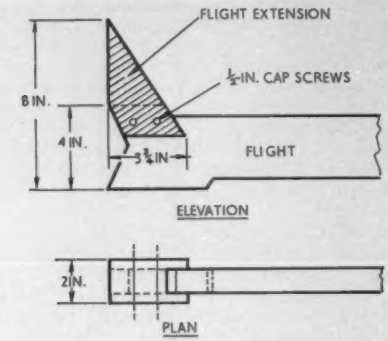


FIG. 8.—SIDE AND PLAN VIEW OF FLIGHT EXTENSION.

set studs to holes drilled into the loader cover and intended to cover the gap between the end of the travel of the loader arms and the edge of the conveyor. Fig. 9 shows the arrangement.

To assist the flow of coal on to the bottom belt conveyor, steel pipes were used at first, these being placed alongside the belt; two of these pipes were "leap-frogged" to position as loading proceeded. The loader operators soon discovered that using steel straps in the same fashion were just as effective, and this practice is now followed.

Operational Results

Table 3 shows the results obtained from the power-loader faces compared with those from the remaining hand-loaded unit. Under normal comparable conditions the ML6 loader gives an increased o.m.s. by approximately 30 cwt., at 3s./ton less face wages cost than hand-filled methods. Even under bad conditions, as on No. 7 face, which during the period quoted was passing over old goaf, the results are better than those from normal hand filling.

The best results obtained by power loading were during the week ended August 22, 1959, when No. 9 face produced 870 tons with a face o.m.s. of 122.5 cwt.

It will be recalled that the aim when power loading was first considered for the High Main was to bring the productivity of this seam up to the level of the rest of the pit. The results given show that this has been achieved.

Size of Coal Produced

No paper on any method of loading would be complete without some reference to the size of coal produced. At the colliery three seams are worked —High Main, Doubles, and Bench—and the susceptibility of the coals to degradation has usually been rated in that order. In February, 1959, a special sizing test was carried out, and it is interesting to note that, while the result confirmed that the High Main sizings had the lowest +1½-in. ratio, in the +3-in. grade the position was different, the High Main ratio being comparable to the rest of the pit. Table 4 gives the percentage sizings for the different seams.

In the case of the High Main Seam, the friable nature of the coal imposes a severe handicap on any method of loading. It is, however, fair to say that the sizing results obtained with the ML6 loader are comparable with those from the hand-filled faces. Owing to trunk-loading commitments, separate size analysis is at present impracticable, but management observations bear out this opinion.

The author expresses his thanks to Mr. J. S. Rayner, Area general manager, No. 4 (Warwickshire) Area, West Midlands Divisional Coal Board, for permission to present this paper, to Mr. F. Thompson, manager at the time the loaders were introduced, and the present manager of North

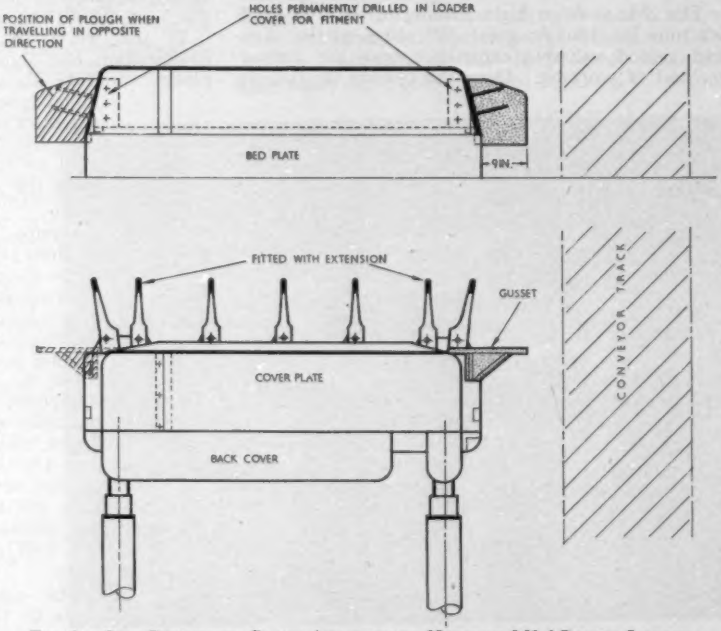


FIG. 9.—SIDE DEFLECTOR PLATE ADAPTION TO HUWOOD ML6 POWER LOADER, THE UPPER SKETCH SHOWING THE VIEW FROM BEHIND THE LOADER.

TABLE 3.—*ML6 Loading Compared with Hand Loading for the Quarter April 11, 1959, to July 4, 1959.*

ML6 loading.						Hand loading.	
7's High Main.		9's High Main.		Combined 7's and 9's High Main.		10's High Main.	
Saleable tons.	O.m.s. cwt.	Saleable tons.	O.m.s. cwt.	Saleable tons.	O.m.s. cwt.	Saleable tons.	O.m.s. cwt.
1,318	95.5	756	106.5	2,074	99.2	1,286	86.9
1,222	87.9	747	100.9	1,969	92.4	1,255	83.4
1,195	86.9	752	117.5	1,947	96.6	1,003	77.4
1,013	85.9	758	104.6	1,771	92.9	1,192	78.9
1,231	89.9	759	115.9	1,990	98.3	1,222	78.9
1,225	88.8	753	110.7	1,978	96.0	1,104	90.2
759	95.5	460	107.0	1,219	99.4	502	62.8
1,266	92.1	757	108.9	2,023	97.7	1,082	83.9
1,193	96.6	750	108.7	1,943	100.9	1,185	84.9
830	73.8	770	110.9	1,600	90.1	826	73.8
804	80.0	721	100.8	1,525	88.6	1,174	82.4
1,221	89.8	474	101.9	1,695	92.9	921	81.9
1,280	98.5	765	116.8	2,045	104.6	1,023	68.9
14,557	89.5	9,222	109.1	23,779	96.2	13,775	80.1

N.B.—During this period No. 7 face was passing over old Smithy goaf.

Warwick Colliery, Mr. C. B. Hopkin, for their interest and suggestions, and to all who have assisted in the presentation of the drawings, tables, and photographs associated with this paper. Any views or opinions expressed are the author's, and are not necessarily shared by the National Coal Board.

DISCUSSION

The branch president, MR. J. V. CUMBERBATCH, asked whether caving had been tried and the degree of saving of manpower likely to be effected with successful caving. He also asked if the author had any figures relating to repairs and maintenance.

MR. PITCHFORD replied that caving had been tried. Before the trial it was known that water difficulties might be encountered and they were prepared to revert to strip packing when the water did, in fact, appear. Only one additional man was supplied for the change from caving to packing, but if the reverse change was now practicable he would expect to save more than one man. With regard to repairs between August, 1958, and April, 1959, the cost of materials for repairs was £479, or 2.85d./ton. The labour cost for the repairs was £51, or 0.31d./ton. Over the same period the wages cost of a full-time fitter covering the three machines was £344, or 2.03d./ton. The total cost for repairs and maintenance for the period was therefore 5.19d./ton.

MR. J. H. WILKINSON said the face manpower for a single-unit face had been given. What was the number of men involved for a double-unit face?

MR. PITCHFORD said that double the manpower was required, except that where two sets of rippers were required for the single face, only three sets were normally required for the double-unit face. In the case in point only four sets had been required for the double and single faces, as both faces shared a common gate road.

MR. J. RICHARDSON referred to the high cost of machine mining because of output losses often due to breakdowns. Had Mr. Pitchford any comment on that? he asked, and he also inquired what spares were necessary and whether these were readily available.

The AUTHOR replied that an advantage of the machine system in use was the easy changeover to hand filling in the event of a breakdown. He could recall three machine breakdowns since the original installation, and on each occasion the faces had been completed by hand and the machines flitted through when repaired. With regard to spares, the comparatively small capital cost of the machine enabled a spare machine to be kept available to permit regular overhauls. Certain spares, *i.e.*, hydraulic rams and posts, appeared to be difficult to obtain at present.

MR. T. L. CARR asked what characteristics in seams Mr. Pitchford would look for, to give successful application elsewhere. Had the accident rate fallen or risen since the introduction of the machines? he asked.

MR. PITCHFORD said the main thing he would want to know was whether the coal had a good parting from the roof. Given those conditions he was confident the machine would be suitable for most seams of 2 ft. to 3 ft. 6 in. thick. The accident rate had fallen. He had no precise figures available, but could say the colliery figures were below Area average and the power-loader face figures below the colliery average.

Answering Mr. Wilkinson, the AUTHOR said that coal preparation normally took place on the previous shift. Since the paper was written, the Cardox blasting had been widened to holes approximately 6 yd. apart, with a cost (excluding shotfiring wages) of 6d. to 7d./ton.

Asked whether dust-suppression arrangements were

TABLE 4.—*Percentage Size of Product for the Different Seams Mined at North Warwick Colliery.*

Grade.	Size.	Pooley Bench.	Amington Bench.	Doubles.	All seams except High Main.	High Main.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Large house	+ 6 in.	12.2	11.5	3.6	9.3	8.2
Washed cobbles	6 in to 3 in.	7.7	7.0	5.9	6.9	6.1
Washed bakers' nuts .	3 in. to 1½ in.	11.3	12.7	15.9	13.2	10.9
Washed D.S. nuts ..	1½ in. to ¾ in.	14.7	16.1	19.6	16.7	15.8
Washed slack	1½ in. to 0	5.7	5.7	4.6	5.4	6.9
Pea slack	¾ in. to 0	32.7	33.5	37.3	34.4	35.7
Primary dust	⅛ in. to 0	15.7	13.5	13.1	14.1	16.4

necessary, he said only wet cutting was needed in this installation. Dust samples were regularly taken and all were satisfactory. The hydraulic cycle of operations gave a maximum rate of machine travel of 3 ft. 8 in., but this rate was slowed down by support erection, temporary stops depending on coal preparation, etc. In practice, the loading advance was at the rate of about 1 ft./min., *i.e.*, 20 yd./hr. At North Warwick, the ideal length of face for the seam thickness of 2 ft. 3 in. was found to be about 130 yd.

MR. T. I. KING asked if there was any possible advantage, having regard to the fact that gumstowing was practised, in using wood props and leaving them in the wastes.

MR. PITCHFORD said that he had known cases where very thin wood props had been used as described. It was simply a question of supplies and economics. He saw no advantage applied to the case in point.

MR. J. H. RICHARDSON drew attention to the machine being almost totally enclosed and the fact that guards were unnecessary. Did the author think this was one of the safer methods of power loading?

MR. PITCHFORD said that in his opinion the machine was the safest buttock machine. As all moving parts were at the end away from the operator, the supports could be set between the loading part of the machine and the jack posts, and the machine, being quiet in operation, enabled the operator to hear all that was going on around him. Only the plough type of operation, where all workmen were enabled to keep to the goaf side of the conveyor, was possibly safer.

MR. T. FOWKE, in moving a vote of thanks to the author, said he had seen the machines at North Warwick, and could confirm that the results were satisfactory and that the loaders could cope with bad conditions when necessary. Those factors, together with the low capital cost, made the machine an attractive proposition.

MINING ENGINEERING SURVEY

PUBLISHERS of "A Survey of Mining Engineering" continue to experience a brisk demand for copies. The survey, which contains 18 articles covering a wide range of mining topics and a general review of the papers given at the symposium on Shaft Sinking and Tunnelling, held under the auspices of the Institution of Mining Engineers concurrently with last summer's Mining Machinery Exhibition in London, is edited by Sir Andrew Bryan and Mr. F. H. Harley.

Its publication was conceived of a desire by the editorial staff of IRON AND COAL to provide a permanent and useful memento of the exhibition, which was promoted by the Council of Underground Machinery Manufacturers.

Copies (price 15s., post free) may be obtained from Industrial Newspapers, Limited, John Adam House, 17-19, John Adam Street, Adelphi, London, W.C.2.

FORTHCOMING EVENTS

APRIL 22

Institution of Civil Engineers: Visit to the civil engineering works of the National Coal Board in the Neath Area, followed by "Surface Reorganization of a Group of Collieries," by G. A. Jones, at the Town Hall, Neath.

APRIL 23

Institution of Production Engineers (North Midlands Region): One-day conference at the Welfare Hall, Rolls-Royce, Limited, Derby, at 9.30 a.m.: "The Production Engineer in a Changing Economy."

APRIL 25-29

Compressed Air and Hydraulics Exhibition and Conference: Empire Hall, Olympia, London, W.14.

APRIL 25-30

Production Exhibition: National Hall, Olympia, London, W.14.

APRIL 26

Combustion Engineering Association (North Western Region): Meeting at the Engineers Club, Manchester, at 2.30 p.m. "The Working of the Clean Air Act Over the Past 12 Months," by J. E. Richards, assistant smoke prevention officer, Manchester Corporation Health Department.

Combustion Engineering Association (Scottish Region): Meeting at the Douglas Hotel, Galashiels, at 10 a.m. Films, followed by discussions on "Modern Methods of Oil Firing" and "The Utilization of Small Coals."

Institute of Marine Engineers: Annual general meeting at the Memorial Building, 76, Mark Lane, London, E.C.3, at 5.30 p.m.

APRIL 27

Institute of Metals: Meeting at 17, Belgrave Square, London, S.W.1, at 6.30 p.m. "Deformation and Fracture of Ionic Crystals," by Dr. J. Washburn, Associate Professor of Metallurgy, University of California.

Institution of Mechanical Engineers: Annual meeting at 1, Birdcage Walk, Westminster, London, S.W.1, at 6 p.m.

APRIL 27-MAY 5

Fuel Efficiency and Power for Industry Exhibition: Grand Hall, Olympia, London, W.14.

APRIL 28

Coke Oven Managers' Association (Northern Section): Joint meeting with the Institution of Gas Engineers (North of England Section) at the Three Tuns Hotel, Durham, at 7 p.m. "Centralized Control in a Modern Coke-oven Plant," by M. D. Edington and H. Millner.

Combustion Engineering Association (Western Region): Meeting at the Park Hotel, Cardiff, at 10.30 a.m. "Research Towards Improving Mechanization and Automatic Control in Industrial Coal-fired Boilerhouses," by G. G. Thurlow, superintendent, boiler department, British Coal Utilization Research Association, and a visit to Albion Colliery, Abercynon.

MAY 3-4

Society for Analytical Chemistry: Joint meeting with the Iron and Steel Institute and the Institute of Metals on "The Determination of Gases in Metals" at Convocation Hall, Church House, Great Smith Street, London, S.W.1.

MAY 3-5

Iron and Steel Institute: Annual general meeting in London at the Royal Commonwealth Society, Northumberland Avenue, W.C.1, the Great Hall, Caxton Hall, Caxton Street, S.W.1, and Church House, Great Smith Street, S.W.1.

MAY 4-6

Institution of Plant Engineers: Annual conference at the Grand Hotel, Scarborough.

Institution of Chemical Engineers: International symposium on distillation at the Dome, Brighton.

National Association of Colliery Managers

APRIL 29

Kent Branch: Annual dinner-dance at the County Hotel, Canterbury; reception at 7.30 p.m.

MAY 6

Lancashire Branch: Annual meeting and dinner at the Pack Horse Hotel, Bolton.

MAY 9

Midland Branch: Annual general meeting at the Five Ways Hotel, Nottingham, at 6.30 p.m.

MANUFACTURE OF CRANKSHAFTS

Weights Exceed 100 Tons for Marine Diesels

Manufacture of a crankshaft presents a greater challenge to all concerned than the production of any other part of a reciprocating engine, particularly heavy marine diesel engines where shafts weighing over 100 tons in the finished state are now commonly used. The subject is discussed by R. Atkinson in a paper presented to the North East Coast Institution of Engineers and Shipbuilders, the author dealing first with development of the original Doxford shaft and then with present production methods of the modified form. The following is a summary of the paper.

Crankshaft Materials

BASIC materials for the forgings for the crankshafts are steel ingots. These include the feeder head, which not only provides a reservoir of molten metal to feed the body of the ingot during solification but also serves for handling the ingot during the forging operation. Not all the ingot goes into the forgings, discards of about 20 per cent. and 5 per cent. being made from top and bottom, respectively, at some convenient stage of manufacture. The top-end discard eleminates piping and excessive segregation, while the removal of bottom-end material ensures that end irregularities often associated with forgings made from large ingots do not mar the finished product. It is a classification requirement that the diameter of the ingot shall be at least 50 per cent. bigger than the largest section of the forging produced and considerable skill is required to meet this condition as economically as possible.

The percentage composition of the steel is as follows:—C, 0.20 to 0.25; Si, 0.35 maximum; Mn, 0.60 to 0.80; S, 0.05 maximum; P, 0.05 maximum. Small amounts of other elements, such as nickel and chromium, are added to give the properties required for each forging.

The main crankwebs are supplied as forged, rectangular slabs having an ultimate tensile strength of 31 to 35 tons/sq. in. and a yield point of not less than 15 tons/sq. in. These values are specified to meet the stresses incurred in the shrinking process. It is worthy of mention that although Doxford uses 31 to 35-ton steel for all crankwebs, this is partly for uniformity, as, for certain designs of shafts, 28 to 32-ton material is adequate. The slabs are annealed at between 870 and 900 deg. C., and slowly cooled in the furnace. They are then rough machined, leaving approximately 1 in. allowance on all surfaces, and normalized by heating to approximately 900 deg. C. They are kept at this temperature until they are uniformly heated throughout and are then allowed to cool in still air. Finally, they are tempered by heating to not less than 600 deg. C. and cooled in air.

The centre crankpins are forged from steel of 28 to 32 tons/sq. in. tensile strength. These pins are normally forged to within 1½ in. of the finished diameter and in these circumstances their heat-treatment, which is identical to that described for crankwebs, is completed prior to rough machining. They are finally rough machined at the forge to 6 mm. above the finished diameter.

The other forgings required for the forward half of a four-cylinder shaft, which may be taken as a representative unit, are the coupling piece, a side web and pin and a 90-deg. double web and journal. Their chemical composition is the same as that quoted for the crankwebs, and their tensile strength is 28 to 32 tons/sq. in.

Prior to forging, the ingot is annealed at 900 deg. C. to refine the structure, the soaking period being normally 1 hr. per inch of section, but the method used to forge it to shape depends, of course, on the particular forging required. It is proposed to mention two of these only, the 90-deg. double web and journal and the side web and pin. Various techniques have been developed for forging the 90-deg. double web and journal in so far as some forges find it economical for reasons of handling to make two similar components as one forging and to separate them later, whereas others employ what may be called the "twisting technique." Since the latter is, perhaps, the more interesting it is described here,

In this process the first operation is to form the central portion of the ingot roughly to the shape of the two webs and to forge two flattened sections at the ends which will eventually form the crankpins (Fig. 1). After allowing the forging to cool slowly a gash is cut in the central block to form

FIG. 1.—FORGING FOR 90 DEG. DOUBLE WEB AND JOURNAL.

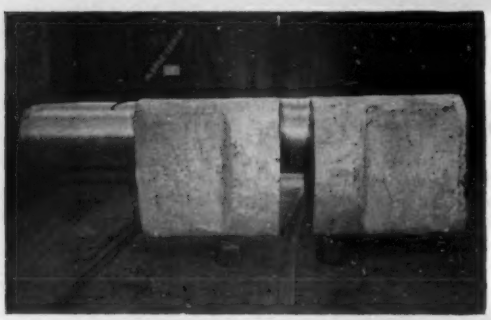


FIG. 2.—FORGING FOR 90 DEG. DOUBLE WEB AND JOURNAL.

the journal portion (Fig. 2). This may be done by machining, flame-cutting, or drilling. The journal is then rough machined, since any flutes or corners on it would cause disastrous irregularies to form during twisting. Next the forging is returned to the furnace and heated once again to the full forging temperature. One end is held beneath the press and the moment required to twist it to the required angle is supplied by attaching the hoist of an overhead crane to the end of a large spanner made to fit the free end of the forging.

The angle of twist for a four-cylinder engine is, of course, 90 deg.. but for three-, five-, or six-cylinder engines other angles are required. It may be of interest to recall an occasion when the incorrect angle was produced in error. To correct it a further twist was necessary and, although the forging had finally been twisted through more than 180 deg., it was still quite sound. Finally, surplus material is removed in way of the crankpins and the forging then appears as in Fig. 3.

The completed forging is annealed at 870 deg. C. and cooled slowly in the furnace. It is then rough machined to within 6 to 10 mm. of the finished diameters. Next, it is normalized at 900 deg. C., allowed to cool in still air, and tempered by raising to 650 deg. C., furnace cooled to 400 deg. C. at not more than 25 deg. C./hr. and then cooled in air. Finally, Izod tests (minimum value 20 ft.-lb.), together with micro-photographs, are taken of metal at the end of the pin. These are additional to the usual tensile and bend tests required by the classification society. The finished forging in the rough-machined condition is shown in Fig. 4.

The forging of a side web and pin represents a simpler problem than that of a 90-deg. double web and journal. The normal method is to forge the pin, following which the web is upset as an extension to the pin by placing the crankpin in a die and forging the web portion at right angles to the pin. Thus the grain flow of the steel is kept in the ideal direction, *i.e.*, longitudinal in the pin, round the fillet, and lengthwise in the web. This technique was first used successfully on the early Doxford crankshafts.

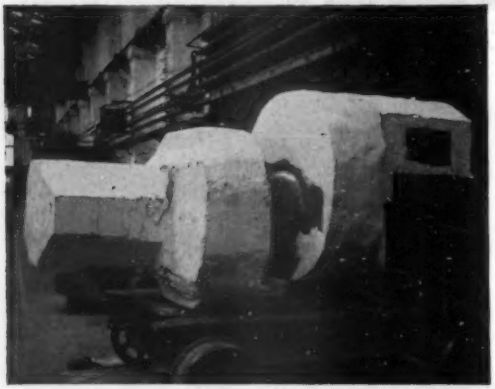


FIG. 3.—FORGING FOR 90 DEG. DOUBLE WEB AND JOURNAL.

FIG. 4.—FINISHED FORGING FOR 90 DEG. DOUBLE WEB AND JOURNAL.

Preparation of Parts for Shrinking

The following work prior to shrinking is carried out by Doxford on the forward section of a four-cylinder shaft after the crankwebs, crankpins, and other forgings have been received from the forge in a rough-machined state.

The two flat faces of each crankweb are planed, leaving 6 mm. on the overall thickness of the slab, and the profile, including the two holes for the crankpins, are then flame-cut to dimensions that allow 1 in. to be removed subsequently by machining. Trepanning the crankpin holes, though slower than flame-cutting, is preferred by one school of thought as it avoids any disturbance of the crystal structure, but if the machining allowance mentioned above is used, no trouble from this cause is experienced. The whole process

of flame-cutting is currently under review by Doxford and consideration is being given to the possibility of pre-heating the webs before cutting. It is possible that this would reduce the heat-affected zone and thus decrease or even avoid completely subsequent machining of the profile, with consequent effect on production cost.

During the operations that follow flame-cutting, the webs are worked on in pairs to ensure the proper symmetry and balance of the shaft. The profile of a pair of webs is machined to the finished size by a slotting process which fully removes the zone of material affected by the burning operation. The webs are then planed to their finished thickness and bored to suit the centre crankpin, which will already have been machined to size. The bores for the side crankpins are then rough machined, leaving 5 mm. radially to be removed after the first shrinking stage.

After drilling the central hole, which is provided for balancing purposes, the centre crankpins are first rough and then finish turned. The balancing hole is then finish bored and the lubricating oil holes are drilled.

Shrinking Process

Since the full-torque loading is transmitted through the shrink fits without the use of dowels or other devices, the successful performance of a shaft in service depends largely on the accuracy with which the parts are prepared for shrinking and on the care taken during the shrinking process. This takes place in stages. The first stage comprises two webs and one centre crankpin shrunk together. For this purpose both webs are set up horizontally at the correct distance apart and carefully clamped. They are then heated by gas burners until the bores have expanded to more than the crankpin diameter. This process may take about 2 hr. and owing to the different amounts of metal that surround the holes, the expansion is somewhat uneven and the bores will be slightly oval at the time of shrinking.

Towards the end of the heating period, the crankpin is suspended from the crane, care being taken to ensure that it is hanging vertically. The gas burners are then removed, the crankpin is lowered into the bores and the webs are allowed to cool. This process requires from 15 to 24 hrs., depending on the ambient temperature, and during this time no restriction is imposed on any small movement which may take place. After cooling, however, a screw-jack is placed between the webs to make the structure more rigid for subsequent handling and machining.

The shrunk unit, hereafter referred to as stage 1, is next set up on a horizontal borer and both holes for the side crankpins are machined at the same machine setting to suit the forward end journal and the 90-deg. double web and journal, respectively.

The stage 2 unit is produced by shrinking the 90-deg. double web and journal into the stage 1 unit. Stages 3 and 4 so far as concerns the shrinking process proceed on similar lines to those already described.

The shrinking allowance used between all mating parts during these processes is 1/500 in. per inch of diameter, this allowance depending to some extent on the surface finishes involved.

The remainder of the paper deals with the final machining and crankshaft assembly.

Book Review

Basic Electronics: The Technical Press, Limited, 1, Justice Walk, London, S.W.3. Six parts, each 10s. 6d., or 54s. per set.

THIS is a companion series to "Basic Electricity," which appeared in five parts early in 1959. In the 11 manuals lies the core of a standard course of technical training developed for the United States Navy, by Van Valkenburgh, Nooger & Neville, Inc. More than 50,000 men have been trained on this course. Manuals derived from it are also being used by many large American concerns for apprentice training schemes, it having been found that technicians can be turned out much faster and at less cost than is possible by old methods of textbook and lecture.

After extensive research with thousands of students the novel technique of teaching, which is the basis of these manuals, was adopted. The essential principles are explained in the simplest possible language, one at a time, each being illustrated by a cartoon-type drawing. Indeed, almost every page in all the manuals carries one or more of these simple visualizations of the principle described.

The approach is strictly non-mathematical, only the simplest equations needed for working with the fundamental laws of electricity being employed. The manuals are obviously only designed to meet the most elementary needs of young students and of those in industry who are expected to acquire the simplest knowledge of electrical principles. Textbooks on electrical engineering, through lack of space, can do no more than present, in the broadest outline, the many intricate functions of electrical circuits and their practical application in the design and operation of electrical plant and apparatus.

For those who must have a simpler approach, these manuals should be helpful. Part 1 deals with power supplies and rectifiers, parts 2 and 3 with amplifiers and oscillators, parts 4 and 5 with transmitters and receivers, and part 6 with frequency modulation and transistors.

The Engineer Buyers' Guide

The 1960 edition of The Engineer Buyers' Guide contains the following:—Forthcoming engineering and industrial exhibitions; associations, institutions, and societies connected with the engineering industry; national undertakings; full names, postal addresses, telephone numbers, and telegraphic addresses of engineering firms; UK agents for foreign firms; trade names. There is also a buyers' guide to chemical plant, electrical equipment, engine and engine parts, machine tools, and sheet-metal working machinery. Entries are confined to firms advertising in The Engineer or the Buyers' Guide itself. Copies are available from The Engineer, 28, Essex Street, Strand, London, W.C.2 (price 9s. 3d. by post).

Plastics Ventilation Tubing

IN an endeavour to overcome the disadvantages of metal and fabric ventilation tubing, a plastics ducting (Fig. 1) marketed under the name of "Flexadux" has recently been developed on the Continent.

Extrudex, Limited, Bracknell (Berks), which specializes in all types of plastics, has developed extrusion processes which make the production of both rigid and flexible ducting tubing an economic proposition, and has recently acquired the manufacturing rights for "Flexadux."

G. E. Simm (Engineering), Limited, Sheffield, has been appointed the sole selling and service agent, and this company will be carrying stocks at its depots in Scotland, South Wales, and Sheffield.

Repair and installation facilities will also be available at these depots. The ventilation tubing is manufactured in Types "S," "B," and "F."

Flexadux Type "S" has a plastics spiral running along its length and welded to the material. Through this spiral runs a strong steel wire enabling this type of tubing to be used for both suction and blowing installations.

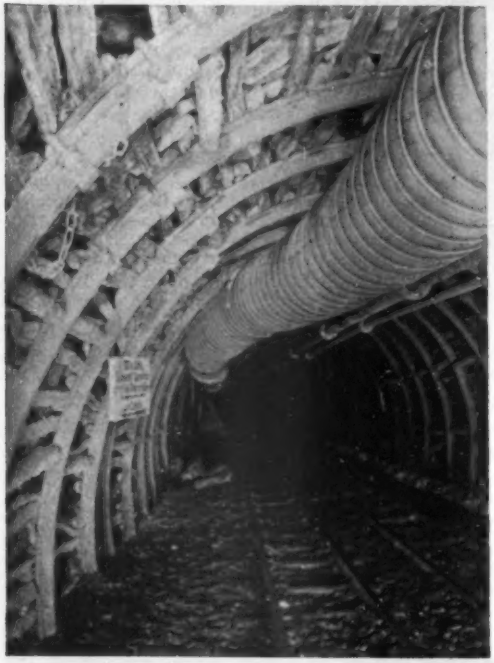


FIG. 1.—INSTALLATION OF "FLEXADUX" IN A GERMAN MINE.

Designed for pressure-boosting ventilation, "Flexadux" Type "B" has corrosion resistant steel rings welded into it at regular intervals along its length.

Both these types are supplied in 15-ft. lengths and are jointed together by a locking ring which makes an airtight joint.

"Flexadux" Type "F" is supplied in longer lengths and can be rolled up flat. This type can be supplied with either telescopic connections or locking rings. All types are supplied with eyelets so that they can be suspended from a cable. This type of suspension is useful in heading work as the ducting can be slid back along the cable during shotfiring.

All types of the new tubing can be readily connected to existing ventilation systems by means of connecting collars. The tubing is supplied in standard diameters of 12, 16, 20, 24, and 30 in. with a material tearing strength of 3,000 to 3,200 lb./sq. in. It is claimed that one man can carry 33 yds. of ducting and can install approximately 90 yds./hr.

Boring of Large Diameter Boreholes

BORING of large diameter boreholes, while not new, still had the essence of novelty as to scope and different applications, said Mr. J. H. Pedley in a paper on "Large Diameter Boreholes for Ventilation and Staple Shaft Sinking" which he read at a meeting of the South Wales Institute of Engineers in Cardiff on March 17.

The technique was well developed on the Continent; in this country, more and more use was being made of the process.

Besides the more obvious applications of connection between horizons, and of ventilation of drifts, there had been instances where men imprisoned by shaft collapse or behind falls had been rescued by boring large holes to establish contact.

The object of Mr. Pedley's paper was to provide information concerning the drilling and use of large diameter boreholes. It sought to set out some of the difficulties experienced and the steps taken to overcome them.

Large diameter boreholes open up a whole field of applications for the mining engineer, but the paper dealt with two specific uses:—(1) To establish forward ventilation in headings, so that greater safety can be achieved when driving interhorizon connections in ground liable to outbursts of firedamp and coal; (2) to facilitate the sinking of staple shafts.

STEEL COAL WAGONS

SERVICE trials of ordinary and low-alloy steel floor plates built into coal wagons that were begun in 1939 have been concluded.

The results, reported by Mr. J. C. Hudson, of the British Iron and Steel Research Association, in the Journal of the Iron and Steel Institute (January, 1960), show that an increase in life of up to 50 per cent. may be expected when a suitable low-alloy steel is used instead of ordinary mild steel.

Coal Handling at

Willington Power Stations

PRACTICALLY the whole of the vibrating equipment used in the coal-handling plant at Willington "A" power station of the East Midlands Division of the Central Electricity Generating Board has been supplied by the General Electric Company, Limited. Forty-eight Sherwen electro-magnetic vibrators, 18 Sherwen electro-magnetic feeders, and two 8-in. dia. Sherwen electro-magnetic conveyors are included in the plant, the total value of the contract being over £19,000.

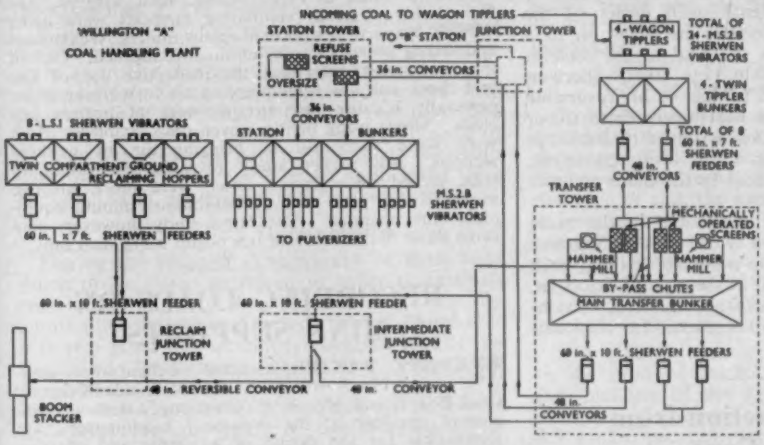
The coal-handling plant is to serve both "A" and "B" stations. It is of particular interest because of the sticky nature of the coal being burnt at the station.

tippler apron, and these have proved extremely successful in removing sticky coal from the wagons should the normal process prove inadequate. The tippler apron vibrators do not need to be of the enclosed type. Control of all the vibrators is effected from the tippler weighbridge.

Each tippler is associated with a bunker fitted with twin outlets from which coal is taken by means of two 60-in. by 7-ft. Shewen heavy-duty feeders, and discharged on to two 48-in. conveyors running transversely beneath the tippler house.

The eight Sherwen feeders have a total coal-handling capacity of 2,000 ton/hr., which is well in excess of the 700 ton/hr. required when both "A" and "B" stations are fully commissioned.

The twin conveyors discharge on to twin-inclined 48-in. belts which take the coal to the top of the main transfer tower. From this point the coal is either fed direct through a by-pass chute into the main transfer bunker or through four mechani-



FLOW DIAGRAM OF THE COAL-HANDLING PLANT AT WILLINGTON "A" POWER STATION SHOWING THE DISPOSITION OF THE SHERWEN ELECTRO-MAGNETIC VIBRATING EQUIPMENT.

The total installed capacity of Willington "A" power station consists of four 100-MW sets, the final unit having been commissioned a few months ago. Work is proceeding on the "B" station, which, when complete, will have two 200-MW turbo-alternator sets.

Difficult to Handle

Coal, which is delivered either by road or rail, is of rather poor quality, consisting in the main of 2-in. to 0 slack, to which is added a percentage of slurry. The moisture content may at times be of the order of 25 per cent.; in consequence, the coal is extremely difficult to handle. Railborne coal is delivered to four side-tipping wagon tipplers. Three Sherwen M.S.2B. vibrators are fitted to each wagon tippler beam, each vibrator being completely enclosed in a mild-steel box to protect it from the ingress of moisture or coal particles. As a further precaution, three more vibrators are fitted to each

cally-operated screens. The undersize from the screens goes into the main transfer bunker, but the oversize is directed through two hammer mills before entering the main transfer bunker.

This bunker is provided with four outlets under which are situated four 60-in. by 10-ft. twin-vibrator heavy-duty Sherwen feeders, each feeder being capable of handling coal up to the required station maximum of 700 ton/hr. Two of these feeders are used to direct coal to the station bunkers, while the other two are arranged to feed the stockpile. The two Sherwen feeders supplying the station bunkers discharge on to two 48-in. conveyors, which terminate in the junction tower. It is from this point that coal will be directed to the "B" station now under construction.

From the same tower, twin 36-in. conveyors transport the coal to the station tower where it is passed through refuse screens before being conveyed to the station bunkers. Each station bunker

is fitted with four outlets which feed the pulverizers on the lower floor, each outlet being fitted with four Sherwen M.S.2B. vibrators to assist the passage of the coal to the pulverizers. The other two Sherwen feeders in the transfer tower discharge on to a 48-in. belt which conveys the coal to the top of the intermediate junction tower. From here a 60-in. by 10-ft. Sherwen feeder directs the coal to a 48-in. reversible belt which passes through the reclaim tower on its way to the boom stacker in the stockyard. Roadborne coal, principally slurry, is delivered directly to the stockpile.

Coal is reclaimed for use through two ground reclaiming hoppers fed by bulldozers. Each hopper, which is divided into two compartments, is covered with a heavy steel grid with 6-in. square aperatures. Each grid is placed on suitable flexible mountings and is vibrated horizontally by four Sherwen heavy-duty L.S.1 units. This is the first time that these vibrators have been used for such an application.

A 60-in. by 7-ft. Sherwen heavy-duty feeder, capable of handling coal up to a maximum rate of 350 ton/hr. is fitted beneath each outlet of the reclaim hoppers. These feeders discharge on to a 48-in. belt, which conveys the coal to the reclaim tower. From here a 60-in. by 10-ft. Sherwen feeder directs the coal on to the 48-in. reversible conveyor running between the intermediate tower and the boom stacker. This is arranged to discharge the coal, via a chute, on to a 48-in. conveyor, which then transports the coal to the main transfer bunker.

A small sampling plant is situated in the main transfer tower and employs two 8-in. dia. Sherwen conveyors, one 6 ft. and the other 10 ft. long, each of which handles small coal at the rate of 5 ton/hr.

The New Conveyor Company, Limited, Smethwick (Staffs), was the main contractor for the coal-handling plant.

Timber Extraction from Chance Cone

DEVISED by Mr. T. Emrys Smith, manager of the National Coal Board's Cwm coal-preparation plant, a simple means of eliminating timber from the coal flow through a coal-preparation plant has proved very successful in use at Nantgarw. Mr. Smith's idea involves the cutting of an opening, 9½ in. in width, in the side of the Chance cone at the washery. A short water chute is attached to the outer side of the opening, so arranged that the bottom of the chute is 2 in. below the normal water level of the cone. The chute discharges on to a specially fabricated dewatering screen fitted with a vibrating mechanism.

When the cone is in operation water flows out of the opening on to the screen, carrying any timber with it. The action of the screen conveys the timber over a ¼-in. wire mesh and discharges it into a chute while the water, with some sand, is carried from the screen outlet, through a pipe, to the sanding screen hopper. Incorporation of this device in the washery circuit prevents any trouble from timber at the roll crusher in the clean-coal circuit.

Ventilating Problems at Mechanized Coal Mines

DIFFICULTIES encountered at many coal mines in maintaining adequate ventilation of working while using continuous mining machines are described in "Survey of Face Ventilation Practices in Coal Mines," an investigation report (No. 5560) issued by the US Bureau of Mines. Such machines, it is stated, are gaining in popularity, but hazards are increasing simultaneously.

"The bulk of the machine, the rapid advance of working faces, and the increased liberation of methane from the larger expanse of freshly exposed coal surfaces have created ventilation problems that were unknown with conventional mining equipment," the publication comments. "Ignition of gas, especially that caused by machine bits striking hard or pyritic inclusions, have increased at an alarming rate. As the mines penetrate beds under thicker cover at an ever-increasing rate of advance, this problem will probably increase unless face ventilation is improved."

The publication covers visits by safety experts of the bureau to mines in Pennsylvania, West Virginia, and Ohio, where various ventilating methods were being used in connection with continuous miners. Weaknesses and strong points in coursing air are outlined. One of the principal failings was the ineffective use of line and check curtains for conveying air to working faces, especially because the curtains were of porous jute cloth. Mines using tightly woven duck or plastic cloth were more successful in bringing air to working sections. An earlier study revealed that auxiliary fans, placed underground, often were more effective in ventilating places where continuous mining equipment was operated. The latest study, however, concerns those mines that had not begun using such fans.

RECORDING LOADS ON MINE SUPPORTS

MR. N. L. BAXTER, assistant mechanization engineer in No. 3 Area of the East Midlands Divisional Coal Board, and Mr. A. E. Gascoyne, assistant strata control engineer at the divisional headquarters, are responsible for the desigh of a simple and effective device for the continuous recording of loads on all types of underground roof supports. The device consists of a hydraulic capsule coupled by a high-pressure hose to a recording instrument; the hydraulic medium can be either hydraulic oil or a solution of soluble oil and water.

The capsule is a simple hydraulic piston and cylinder device, the tube and seals of the piston being the normal sizes as used in hydraulic props. It is of robust construction to withstand rough usage. Provision is made in the top of the piston to bolt various types of head to the capsule; for instance, a castellated head for use with link bars or a catalin lid for flat or corrugated straps. Provision is also made in the top of the piston for the filling and air bleeding of the system.

The Bristol recording instrument was used in trials with the capsule, but pressure gauges can be used to record pressure for which the Bristol instrument is unsuitable. The capsules are made in two sizes, one for measuring loads in thin seams up to 30 tons and the other, which is slightly larger, for heavier duties. The larger model is capable of accepting loads of up to 70 tons.

NON-DESTRUCTIVE TESTING OF STEEL

Review of Methods in Current Use

During recent years there has occurred a significant change in methods of establishing quality steel products because of advances made in testing equipment and techniques. These were reviewed in a paper by James B. Austin, administrative vice-president, research and technology, United States Steel Corporation, in a paper to the American Iron and Steel Institute and appearing in Blast Furnace and Steel Plant, February, 1960. The following article summarizes some of the points made by Mr. Austin.

NON-DESTRUCTIVE tests are unlike most physical tests in that they require special tehniques and experienced interpretation. When a tensile machine or a hardness tester is purchased, there is little doubt as to how it is to be used and the quantities it will measure.

With non-destructive test equipment, the general method of applying the test is known, but judgment as to the significance of the results may too often be left to an inexperienced operator who knows little, if anything, of the interpretation. The only way to understand clearly the significance of the non-destructive test data is to correlate the results with those of destructive tests so as to build up a background of experience in their special meaning.

Intermediate Discontinuities

During the years of development of these tests, much product was sacrificed in order to establish correlations between the test results and the discontinuities that were detected. It was found as a rule that gross discontinuities could be readily distinguished from those which were minor and insignificant. But interpretation of the severity of intermediate discontinuities was, and still is, difficult and often requires years of operator experience before a meaningful opinion can be expressed. Moreover, the interpretation of test results requires consideration of all factors that influence the test. Poor interpretation can easily result from minimizing the influence of any one factor.

After the large amount of testing performed over the years and the numerous problems encountered in these tests, there is little wonder that the steel industry is at times hesitant to base quantitative judgments on the indications of a nondestructive test. Because of the many variables that influence the quantitative evaluation of the results, it is necessary that the study of these variables be supplemented by efforts to develop test equipment that will be influenced by a minimum of variables. This will ultimately lead to reliable interpretation of test results and give the foundation for workable material acceptance specifications.

While the field of non-destructive testing includes all tests than can be performed without rendering the test-piece unserviceable, it is generally considered to consist of four general types. These are:—Ultrasonic; penetrant and magnetic particle; radiation; eddy current and magnetic induction. Each type of test is designated by its basic physical principle of operation. The designations are, of course, rather broad and are usually further divided into smaller categories based on specific methods and techniques.

X-ray or Gamma Ray Examination

Probably the oldest scientific approach to non-destructive testing is the use of radiation. Shadowgraphing solids with penetrating radiation has long been used to detect discontinuities in steel. In this type of test, the item to be tested is placed on a sensitized film and irradiated with X-rays or gamma rays. The varying thicknesses of the part result in differences in absorption of the radiation and cause differences in exposure of the film. Discontinuities such as voids, porosity, inclusions, and cracks can thus be detected.

The ability to detect a discontinuity is related to the ratio of thickness of the discontinuity to the thickness of the part being tested. Generally, detection of discontinuities that have a thickness of 0.5 to 1.0 per cent. of the thickness of the part irradiated requires operating skill and special techniques. For example, it would not be advisable to test flat-rolled products for laminations by this method because such laminations produce only a negligible change in the transmitted radiation.

Radiography using either an X-ray or gamma ray source is costly and slow. In consequence, the availability of cheaper and faster methods of detecting discontinuities in semi-finished billets and blooms has generally eliminated radiography of these products on a production basis. Processing of radiographic film requires precise darkroom procedures, so recent developments have aimed at eliminating such processing by incorporation of fluorescence amplifiers by which the radiographic image can be viewed instantaneously on a screen. For example, the national tube division of the corporation has adapted these fluoroscopic techniques to the examination of weldments in large welded tubes. In this instance, the image can be

viewed on closed-circuit television screens in areas remote from the inspection line.

Another recent improvement in the inspection of welds in tubes uses a sensitized paper to record the image of the weld. The paper, which lends itself to rapid processing techniques, is laid along the weld on the outside of the tube and the X-ray source moves through the tube itself. This method is rapid, inexpensive, and can be adapted for the inspection of either longitudinal or circumferential welds. Although radiography has limited application on forged and rolled products, it is the only test that can be reliably applied to establish the soundness of cast products.

In the steel industry, X-rays, gamma rays, and beta rays are also being used for gauging the thickness of plate, sheet, and coatings. One of the common uses is for measuring the thickness of the tin coating on tinplate. This test, which provides information on a continuous basis, is all the more important now that many customers are ordering tinplate in coils rather than as sheets.

Eddy Currents and Magnetic Induction Tests

A test employing eddy currents and magnetic induction is becoming more widely used for detection of surface discontinuities in such products as cold-drawn bar and tubing. These principles have also been applied to problems of sorting mixed steels, and to determining thickness of non-magnetic coating on ferro-magnetic materials. Although many specific tests have been developed using these principles, their application has been hampered by limited understanding of the induction of eddy currents and magnetic fields in polycrystalline materials.

There are various methods of inducing eddy currents in a material. In some tests the coil encircles the part to be tested; in others a type of search coil is placed near the test surface. Frequently, a combination of encircling and search coils is used. When an alternating current is applied to the coils, eddy currents are generated in the surface of the part being tested and cause a reaction on the coil, thereby producing changes in its reactance and impedance. The extent of these changes is influenced by the conductivity and permeability of the material and the position of the coil with respect to the material. When applying eddy current methods to the detection of surface discontinuities the reactance and impedance of the coil are further changed by the size, shape, number, and nature of the discontinuities. In practical tests, the electrical influence on the coil that results from coil position and material conductivity and permeability is electronically cancelled, so that only changes resulting from the presence of discontinuities are indicated as the coil is moved over the part.

The conductivity and permeability that influence the electrical characteristics of the eddy current test can be directly related to the condition of the material. Such factors as temper, the presence of alloying elements, local stresses, and geometry of the material are important considerations. Before a practical application of this type of test can be considered it is necessary to minimize the effect of such variables which lead to misinterpretation of the test results. Eddy current tests have been applied most successfully on non-magnetic steels. Present efforts are being directed toward improvement in the testing of ferro-magnetic materials. The chief problem is to overcome the influence of variations in permeability that exist in most steels.

Ultrasonic Tests

Of the four broad types of test, the most widely used for detecting internal discontinuities in steel products is the ultrasonic test. Its versatility has permitted many different methods and techniques to be developed, but has also hindered the standardization of test procedures. The chief advantages in the use of high-frequency sound waves are the ability to penetrate through large sections of steel and to obtain results instantaneously.

There are three general methods by which ultrasonics can be used—resonance, through-transmission, and pulse-echo. The resonance method is used primarily for gauging thickness of sheet and plate products, though some effort has been directed toward using it for detecting open lamination in these products. Techniques employing the through-transmission method are being used successfully in checking small machined parts. This method is particularly applicable because a fixture can be adapted to position the part between the ultrasonic transducer and receiver. When a discontinuity is present in the part, the amount of energy that passes through the part to the receiver is lessened, thereby, indicating some irregularity in the part.

The pulse-echo method is used most frequently on large steel sections and its results are the most difficult to interpret. In this method the transducer transmits the ultrasound and then becomes a receiver to pick up the echo signals that are reflected both from the back surface of the part and any internal discontinuities that may be present. There is no standard operational procedure for performing tests with the pulse-echo method. An operator can choose to use various test frequencies, wave modes, and methods of calibration.

Ultrasonic test equipment, available commercially, employs several discrete test frequencies, ranging from 0.5 to 25.0 megacycles. For testing steel, frequencies of 1.0 and 2.25 megacycles are most commonly used and are consistent with the detection of physical discontinuities that may impair the physical properties of the steel. The concept on which this method is based is that the minimum size of a physical discontinuity that is detected at each operating frequency is about one half the wavelength. Thus, if one is operating at 2.25 megacycles per sec., a frequency that corresponds to a wavelength of 0.1 in., discontinuities as small as 0.05 in. for the largest dimension are detectable. Because of the inverse relationship between frequency and wavelength, the higher the frequency the smaller the size of the discontinuity

that can be detected. Proper choice of test frequency is thus very important to the proper interpretation of the test results.

Three different wave modes can be used in ultrasonic tests. Longitudinal waves are most commonly used to detect internal discontinuities in large forgings, blooms, billets, bars, and plate products. Testing techniques employing shear waves are used to detect such discontinuities as seams and stringers in tubing, slag, or cracks in weldments, and surface seams and snakes in plates. Surface waves require a smooth surface and are generally confined to detections of surface cracks in machined products.

Unification of Ultrasonic Test Procedures

Choice of method of calibration of the equipment has become a problem in the attempt to unify the ultrasonic test procedures. Each company and, in some instances, each plant, has its own calibration methods so that each uses a different test sensitivity. As a result, it is difficult for one to understand the significance of another's results. There is also a tendency to test at high-sensitivity levels in order that even the smallest discontinuity presents an ultrasonic indication having a large amplitude. An individual witnessing this test, if not aware of the high test sensitivity, would consider the discontinuity to be of a gross nature and it is often difficult for an experienced operator to explain that the large ultrasonic indication is received from an insignificant inclusion.

It has been the experience at plants within the organization of the corporation that variations in test results were traceable to the performance of the test equipment. To eliminate these variations, a standardization programme has been initiated and a standard test kit is now provided for each ultrasonic instrument. With this kit an operator can establish whether or not the performance of his instrument and transducers is up to par. This is felt to be a necessary forerunner to standardizing methods of calibration and test procedures.

While the ultrasonic test can be applied to detection of surface discontinuities, it is generally considered most useful as a test for internal discontinuities. For detecting surface discontinuities such as seams and cracks, the fourth type of test using dye penetrants or magnetic particles is the most practical. The tests consist of flowing a fluid of low-surface tension over the surface of the part. After sufficient time for the penetrant to work its way into any minute cracks or fissures which may be present on the surface, the surplus penetrant is removed. A powdery substance, called a developer, is dusted over the surface and absorbs the penetrant from the discontinuities, providing a visual indication of any discontinuities. The developer is a contrasting colour from that of the type to provide good visual detection. Penetrants which fluoresce under ultra-violet radiation are commonly used. This type of test is used primarily on non-magnetic materials such as some of the stainless steels. For example, use of this test for detecting slight pinhole type porosity in stainless steel is becoming common. With this procedure, qualitative acceptance levels can be specified which are based on the number of indications within a given area. Recent attempts by some to establish more quantitative standards on the basis of the size of the individual dye patches have been unsuccessful.

Magnetic Particle Type Inspection

For detection of surface discontinuities in ferromagnetic materials, it is preferable to use magnetic particle type inspection. This test consists of magnetizing the sample so that magnetic flux leakage occurs around surface discontinuities such as seams or cracks. When the magnetic particles, in the form of dry powder or suspended in a fluid carrier, are sprayed over the surface they cling to areas where there is leakage of magnetic flux. Particles of various colours are used to provide contrast with the surface that is inspected. Specially treated particles that fluoresce under ultra-violet radiation are often used. The improved detection of surface discontinuities with the use of magnetic particle tests and the unmistakable prominence of the fluorescent indication has led to the gradual adoption of this method for inspection prior to surface conditioning.

The manner in which the steel industry is using the magnetic particle test shows strong evidence of the continuing efforts being made to improve the quality of steel. By replacing the unaided visual inspection for seams in billets with the fluorescent magnetic particle test, the bar product rolled from these billets has superior surface quality. At present, the handling of material for this inspection is partially mechanized and complete mechanization will follow. Use of such non-destructive tests at intermediate stages of processing results in reduced scrap losses and provides an improved quality product.

School of Welding Technology Courses

EIGHT courses have been arranged by the School of Welding Technology between May and October. Full details may be obtained from the Institute of Welding, 54, Princes Gate, Exhibition Road, London, S.W.7. The courses are:—

Ultrasonic Inspection (May 2-5); Welding Course for Supervisory Staff (May 16-19); Health and Safety in Welding (May 21); Training and Testing of Welders (May 30-June 1); Welded Pressure Vessels (September 26-30); Residual Stresses and Stress Relief (October 10-11); Practical Control of Distortion (October 12-14); Metal Spraying (October 24-27).

Provisional information concerning courses to be held between November, 1960, and May, 1961, is also available on application to the institute.

THE Bank of London & South America reports that Fábrica Argentina de Caños de Acero e Industrias Metalúrgicas has applied to the municipal authorities of Tigre for authorization to install a plant to make steel tubes. The subsidiary will be exempt from payment of local taxes for the first 15 years.

Iron and Steel Industry on Postage Stamps

By H. HOCKE

STAMP-ISSUING countries have an ever-watchful eye on the pockets of the stamp collector, and one sees more and more designs of flowers, birds, etc., to cater for the increasing number of thematic collectors. Even the iron and steel industry has made an impact and a few examples from the many stamps that are now available on this subject are referred to in this article.

Like most minerals, iron ore must be mined and this is usually done in open-cast mines. A fair proportion of our imported ore comes from the Commonwealth (Sierra Leone and Newfoundland). On one stamp, Sierra Leone, on the west coast of Africa, shows the ore mines at Marampa. The

FIG. 1.—A SIERRA LEONE STAMP SHOWING THE IRON-ORE MINES AT MARAMPA.

actual iron content varies between 50 per cent. and 60 per cent. and the ore is loaded into ships at the port of Pepel.

One example of European iron-ore mining is illustrated by three stamps. Two of Austria and one of Germany all show the well-known old open-cast iron-ore mine at the town of Eisenerz (meaning iron ore) in Styria, Austria. The design in all three cases shows the Erzberg (meaning ore mountain), a mountain which is about 4,600 ft. high. It is terraced from the ore removal. The ore is also of fairly high iron content and has been mined since Roman times.

Open-cast mining is a much better method than underground mining. Apart from eliminating most underground hazards, the ore can be loaded directly into railway wagons. A stamp of China shows a large digger at an ore mine and a train of four-axle ore wagons.

Manganese ore is mined in Ghana, and there are two stamps, one of the former Gold Coast, the other of Ghana, showing the same design of an open-cast manganese ore mine.

Tin is required for the coating of steel strip. It is usually derived from the ore tinstone or cassiterite in the form of its oxide SnO_2 by washing. The old method of hand washing is illustrated on a stamp of Nigeria. For obtaining the raw materials on a larger scale dredges are used. A stamp of the Federation of Malaya shows a tin dredge at work on the river bed.

As previously mentioned, some of our ores come from Newfoundland. Two stamps of Newfoundland show an ore carrier being loaded at Bell Island. Specially built ore carriers are the best ships to transport iron ore, particularly from the unloading point of view. Unfortunately, only two ports, Tyne Dock and Glasgow Terminus Quay, are able to accept the very large ships, so a great proportion of imported ore is still brought by general cargo ships. Thus, for example, the old converted Liberty ships, of the Andros class, are familiar vessels in our ports. They can usually carry a load of about 9,000 tons to 10,000 tons of ore per trip. One Liberty ship is shown on a stamp of the United States.

One of the large docks for discharging iron ore is Antwerp, illustrated on a stamp of Belgium. The ore is unloaded by crane or unloader from ore-carrying ships to wagons for Belgian steelworks, or to barges for Rhine and Ruhr steelworks and for some Belgian steelworks along the Meuse, such as Charleroi and Mons. Eighty per cent. of the ore imported here comes from Spain and Sweden. The ore is unloaded at a quay in the Hansa Dock, the nearest dock to the sea. Access is obtained via the Kruisschans Lock, which is 885 ft. long, 114 ft. wide, and 46 ft. deep at high water. The depth of water impounded in the dock is 39 ft.

Iron and Steel Institute Awards

COUNCIL of the Iron and Steel Institute announces the award of medals and prizes, presentation of which will be made at the institute's annual general meeting at the Royal Commonwealth Society, Northumberland Avenue, London, W.C.1, on May 3.

Recipient of the Bessemer Gold Medal for 1960 is Prof. Dr. Hermann Schenck, director of the Institut für Eisenhüttenwesen, Rheinische-Westfälische Technische Hochschule, Aachen, and president of the Verein deutscher Eisenhüttenleute.

The Sir Robert Hadfield Medal for 1960 goes to Dr. J. C. Hudson, head of the corrosion section of the chemistry department of BISRA.

The Andrew Carnegie Silver Medal for 1959 is awarded to Dr. P. R. V. Evans, Armour Research Foundation, Chicago, formerly research department, Metropolitan-Vickers Electrical Company, Limited, Manchester, for a paper on "The Effect of Rolling Unstable Austenitic 0.76 per cent. Carbon Steel at 220-300 deg. C." His co-author, Prof. Hugh O'Neill, was not eligible for an award.

Award of the Williams Prize for 1959 is to be made to Mr. I. M. D. Halliday, research and development department, the United Steel Companies, Limited, Rotherham, for a paper on "Continuous Casting at Barrow."

New Equipment and Products

Flameproof Air-break Switch Unit

DESIGNED to conform to National Coal Board Standard Specifications for 400/650-volt, three-phase, 25/50 cycles operation, the Type P.59 flameproof airbreak gate-end switch, illustrated in Fig. 1, is manufactured by the Wallacetown Engineering Company, Limited, Ayr. The fabricated steel enclosure has two separate compartments, the upper one containing only the isolator and the busbars, all other equipment being contained in the lower main compartment.

The upper compartment contains a set of three-phase 300-amp. copper busbars and a 150-amp. reversing type isolator. The external operating handle can be padlocked in the "off" position. The isolator is electrically interlocked with the contactor and a mechanical interlock is provided to ensure that the main cover of the lower compartment cannot be removed or rendered non-flameproof unless the isolator is in the "off" position, and to ensure that when the main cover is open the isolator cannot be inadvertently closed.

The lower compartment houses a chassis mounted, 30-amp., triple-pole contactor, fitted with a powerful magnetic blow-out coils and sintered silver tungsten contacts. Each pole is fitted with a grid-splitter type arc shield, easily removable; contact alignment and pressure are easily adjustable. Operation is by a.c. magnet and the contactor coil has an inherent under-voltage release feature. Two magnetic pattern over-current relays with double acting dashpot time-lags are provided. The voltage transformer has six primary tappings from 400 to 650 volts, the windings being protected by cartridge type fuses.

Fitted to the inside of the hinged main front cover of the enclosure is a dust-tight unit housing the plug-in type sealed control and earth leakage relays, pilot and earth leakage test buttons, indicator lamp, stop and start buttons, selector switch, rectifiers, and control resistance. By removing only two small setscrews and disconnecting the plug and socket, the control unit may be detached from the enclosure, simply and quickly.

In addition to under-voltage and overcurrent protection, earth fault protection is provided by an earth leakage relay being set to trip on a fault current of 1.5 amps. or more. An incoming cable may be arranged at either or both ends of the unit. The terminator chamber also forms an intertrunking so that the units may be arranged for multi-panel or switchboard formation.

Stepless Variable Gears

AN addition to the range of hydraulic, steplessly variable speed gears produced by Carter Gears, Limited, Bradford (Yorks), means that these units are now available in 10 sizes, from fractional horse power up to 40 h.p.

The new unit is at the top of the horse-power range. It has maximum steady load ratings of 40 h.p. at 700 r.p.m. (12-hr. ratings) and 35 h.p. at 700 r.p.m. (continuous rating), with equivalent constant output torques of 3,600 in.-lb. and 3,150 in.-lb., respectively. It gives a stepless range output speeds from input speed down to about 25 r.p.m. and may be used to pick up loads from zero r.p.m. It may be driven in either direction of input rotation and, if required, a reverse drive of up to 5 per cent. of input speed can be provided without reversal of the driving motor. Full reverse speed can be obtained by reversing the input rotation.

The unit is housed in a dustproof case, which also acts as an oil reservoir. The internal mechanism, although not immersed in or dipping into the oil sump, is entirely self-lubricating. The gear is equipped with a built-in make-up pump driven by a separate motor and is fitted with an oil filter.

Water Infusion Pump and Gun

NEW type of water infusion pump and a new water infusion gun have been introduced by Richard Sutcliffe, Limited, Horbury, Wakefield. The pump is arranged for variable output and consists of an oil hydraulic circuit which drives two reciprocating rams which are in turn directly coupled to the two rams of the water pump. The oil is supplied from a variable delivery pump which allows the oil circuit to select automatically the pressure and quantity of water to which it is best suited. The output of the water pump is 8 galls. at 3,000 lb./sq. in. and is infinitely variable down to 22 galls. at 1,100 lb./sq. in., the pressure and volume varying inversely.

Control of the pump can be adjusted so that an output of 5 galls. at 1,500 lb./sq. in. can be obtained to supply water for a conveyor ramming system at the same time. Under these conditions, at a small extra cost, the oil circuit can be used to drive, say, a stable hole conveyor or a hydraulic drill.

The variable delivery oil pump is driven from a 30-h.p., fan-cooled, flameproof electric motor. Mounted above the electric motor and pump is a mild-steel tank with two compartments in which are stored the water and the hydraulic oil. A temperature thermostat is fitted to the tank. The whole of the equipment is mounted on a mild-steel fabricated base-

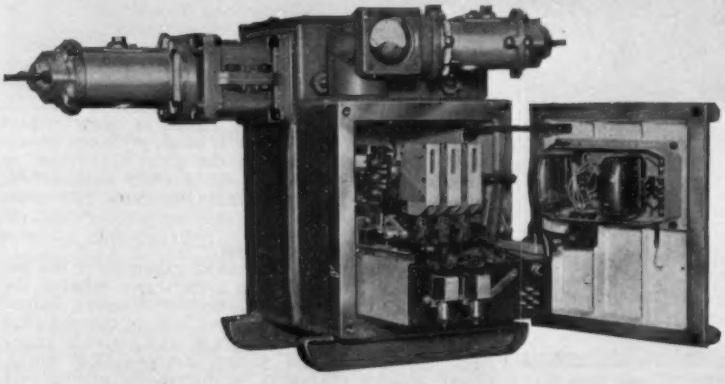


FIG. 1.—TYPE P.59 FLAMEPROOF AIR-BREAK GATE-END SWITCH.

plate. The mounting brackets for the wheels are so arranged that they can be readily allowed to suit any gauge. The new infusion gun has been designed to work with this equipment and has, it is claimed, already proved itself superior to other types.

Development in Belt Drives

IT has been the aim of engineers concerned with power-transmission problems to combine the flexibility and simplicity of the flat belt drive with the higher speed ratios, shorter centre distances, and freedom from slip of the V-belt drive. The problem has now been solved by the development of the "Poly-V" drive (Fig. 2), which is being introduced into the UK by Turner Bros. Asbestos, Limited, Rochdale (Lancs), a member firm of the Turner & Newall organization.

The concept of the new drive is extremely simple. The belt is, in effect, a flat belt with a series of parallel V-shaped ribs moulded on its inner surface. These ribs form the driving surface of the belt and completely fill mating grooves on the pulleys, there being no clearance between the two. Two important benefits are thus achieved: first, the load-carrying member extends across the full face of the drive, unlike the multiple V-belt drive where part of the total drive width available is wasted by the space between belts; secondly, the grooved inner face of the belt has about twice the surface area in contact with the pulleys when compared with a multiple belt drive of similar widths.

These two principal features mean that the "Poly-V" drive can transmit the same load in less space, or a greater load in the same space as a multiple belt drive. It has been found that the drive will increase drive capacity by about 50 per cent.

A further important advantage of the new drive is its versatility and simplicity of installation. The "Poly-V" drive is made in three different profiles. Two of these—the "L" and "M"—between them cover the whole range of power transmission now covered by five different V-belt cross sections. This is because the load-carrying member of the drive is carried above and outside of the pulley grooves and is thus quite independent of the size and shape of groove. Furthermore, the difficulties met with in matching up V-belts are avoided. Considerable savings in belt stocks and in time are therefore possible.

For light drives where single V-belts are normally used there is a smaller section available. The "J" section has extreme flexibility and offers freedom from vibration, characteristics which overcome the problems associated with many small drives.

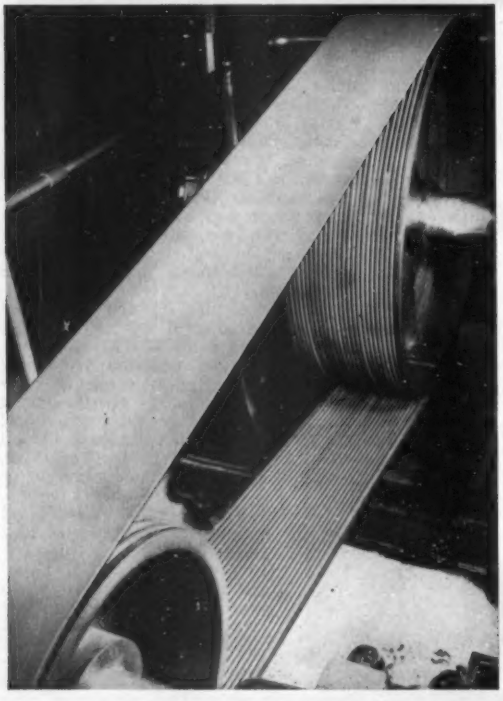


FIG. 2.—THE "POLY-V" DRIVE, COMBINING THE ADVANTAGES OF FLAT BELT AND V-BELT DRIVES.

Electric Motor for Vibrating Drives

SPECIALLY designed for vibrating drives, a new electric motor, the first of its type to be made in the United Kingdom, is now being marketed jointly by the English Electric Company, Limited, Bradford, and the Grantham Electrical Engineering Company, Limited, Grantham (Lincs). The completely self-contained unit provides an inexpensive and reliable drive by eliminating all the mechanical parts associated with an eccentric shaft arrangement. Vibration is generated by out-of-balance weights at either end of the motor which can easily be adjusted by single bolts to give the required output.

The motor is totally enclosed, dust-proof and weather-proof. The frame is of nodular cast iron, with integral feet, and the shaft is of high-tensile steel to withstand the high centrifugal forces to which it is subjected. Because of its vibrating motion, the motor must be mounted on a resilient base. Operating at 1,500 r.p.m. synchronous speed, it has a power output of up to 7,500 lb. centrifugal force, or 10,000 lb. at 3,000 r.p.m. The motor is operated from a three-phase, 50-cycle supply at 110-650 volts.

Typical applications for which the motor is designed are drives for conveyor, screening, hopper and continuous drying systems (especially those for dealing with loose material in bulk quantities), tamping equipment, and machines for breaking or grinding down materials.

Pipelines in Pictures

Designed to give a pictorial survey of the achievements of the parent company and its associates, a book issued by William Press & Son, Limited, London, N.17, is handsomely bound and is in every respect an elegant volume. Full use is made of colour photography in giving details of the group's activities in the fields of civil engineering, pipeline construction, industrial pipework, pipework fabrication, and plant erection.

Insurance Against Corrosion

Colour photographs illustrating examples of the use of "Camrex" non-oxidizing preservative enhance the appearance of a booklet issued by Camrex Paints, Limited, Sunderland. "Camrex," it is claimed, has protected steelwork of all types in such places as paper mills, dairies, chemical plants, iron and steel works, power stations, gasworks, carburization plants, and many others where severe conditions exist, often for periods of 25 years without requiring re-coating.

Programmed Forging Operation

COMPLETELY automatic forging of steel by pre-calculated programme has just been successfully demonstrated in the experimental forge of the British Iron and Steel Research Association in Sheffield—for what is believed to be the first time in any country.

The forging was carried out by a precision controlled 200-ton press interlocked with a fast, remote-controlled, experimental manipulator capable of longitudinal, rotational, and lifting movements. Electric controls had been developed for both press and manipulator to ensure fast, accurate operation and to synchronize the movements of the two machines.

During the forging, the press and manipulator were controlled by a programme control unit on which every detail of the schedule of forging operations had been set up. In this schedule, the upper and lower limits of the squeeze for every pass were given, the manipulator feed between strokes was selected, and the manipulation necessary between passes was also stored. The control unit signalled instructions to the press and manipulator in the appropriate sequence.

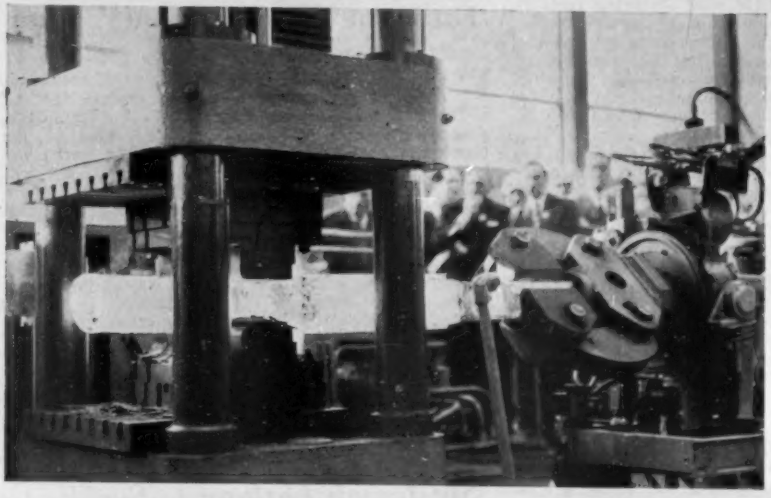


FIG. 1.—BISRA EXPERIMENTAL FORGE AND MANIPULATOR.

Faster Working Shortly

As a consequence, the finished forging in some respects exceeded the best current industrial standards as regards dimensional precision, and even so, the job was accomplished twice as fast as the best skilled forging crew would be capable of doing. Even faster working will be practicable before very long.

The forging schedule was calculated in advance, from a theory of the change in shape during forging which had been worked out in the laboratory.

This advance in forging technique comes when many firms are already planning to re-equip their forges, in some cases to replace machines dating back to the first world war. At the moment there are probably more forging presses on order in this country than at any previous time; this development of automatic working therefore offers the forging industry a great opportunity to place itself ahead of foreign competition.

Expanded Slag Production by New Process

MOST recent development at the blast-furnace plant of the Stanton Ironworks Company, Limited, near Nottingham, is the installation of equipment for the production of expanded slag by a process entirely new in this country. A pilot plant was first installed in 1956 and now, after exhaustive tests, it has been found that blast-furnace slag, which for many years has been so valuable in roadbuilding, may be processed and used in a much wider field of constructional activity.

The method of manufacture, known as the Kinney-Osborne process, is one widely used in the United States. As the slag leaves the blast furnace it is expanded by steam and compressed air, and then solidified by atomized water, giving a product with a uniform honeycomb texture and controlled density.

The product is stable and inert, containing neither free sulphur nor combustible matter, and there are no chemicals present which can adversely affect iron or steel. In this regard it is very similar to pumice and other such materials of natural origin.

It remains stable in volume, and each particle, even the smallest, is composed of innumerable self-contained sealed cells which, for its weight, give it considerable strength.

Expanded slag is eminently suitable as lightweight aggregate. It possesses useful insulating and fire-resisting properties, which make it valuable for the manufacture of building blocks.

It may also be used as a medium for irrigation and aeration in agriculture.

Future for Smokeless Fuel

SPECIALLY reactive manufactured fuels can give satisfactory service in both unimproved and improved open grates, says the Committee on Solid Smokeless Fuels in its report published last Friday. The committee, which investigated the main criticism about solid smokeless fuels, particularly coke, also concludes that coke conforming to the British Standard Specification and low volatile steam coals, other than dry steam coal, can give satisfactory service in improved open grates.

Terms of reference of the committee, appointed in April, 1959, by Lord Mills, then Minister of Power, were to inquire into the availability and suitability of smokeless fuels and plans for future production, and to consider the adequacy of present arrangements and future plans for their distribution. The committee was to confine its examination to the domestic sector up to 1965.

The committee found difficulty in assessing the future demand/supply position, particularly in regard to requirements for the open fire. Sales of specially reactive fuels suitable for unimproved grates in 1958 were 735,000 tons. In 1959, sales rose to 910,000 tons and availability in 1960, which will exceed 1,000,000 tons should go far to overcoming criticism about shortage of these fuels in the winter of 1958.

A Ministry of Power estimate, the report goes on, put the maximum demand for solid smokeless fuels in 1965 at 11,500,000 tons, an increase of about 5,500,000 tons above the current level. The committee believes that one brand name for open fire coke conforming to the British Standard Specification is highly desirable in order to distinguish it from the general run of coke with its associations for many people of variation in quality and indifferent performance.

The report attaches great importance to the Clean Air Act being fully used to ensure that more improved grates in smoke-control areas are installed with the help of the special grants available. The main objectives can best be achieved by a combined operation of producers and distributors.

A suggestion is made that instructional leaflets should be issued with each delivery of fuel to ensure it is used to maximum efficiency. Attempts should also be made to reduce to the minimum the risk of solid smokeless fuels deteriorating before they reach the consumer and to ensure that deliveries of smokeless fuels are made more conveniently for householders, at present finding difficulty in storing the required quantities.

The committee states that the National Coal Board may have to make special arrangements for the production of smokeless fuels in Scotland in the next two years. The Department of Health for Scotland has asked local authorities for an indication of their plans for the designation of smokeless zones.

When the information is received, the report goes on, the Scottish Gas Board should be asked to assess what part of the new demand it will be able to meet. If it is thought there would be a deficiency, the NCB should consider establishing a plant in Scotland for the production of smokeless fuels.

The committee met under the chairmanship of Mr. N. M. Peech, chairman and managing director of the Steetley Company, Limited, and other members were Mr. L. G. Clugston, Cawood, Limited; Sir Henry Jones, chairman of the Gas Council; and Mr. A. H. A. Wynn, member of the National Coal Board. The report of the committee is published by the Stationery Office, price 1s. 3d.

North-Western Divisional Coal Board Changes

DEPUTY marketing director of the North-Western Divisional Coal Board and deputy regional sales manager of the North-Western Sales Region for the past six years, Mr. Tom W. Barker is to retire at the end of the month. Both he and his successor, Mr. R. W. Tyson, at present senior regional sales officer, have served the industry for more than 30 years.

Mr. Barker was former managing director of the Brynn Hall Colliery Company, Limited, and joined Lancashire Associated Collieries, the central selling organization for Lancashire colliery owners, in 1936 as chief industrial fuel officer. During the war he was assistant coal supplies officer for the north-west and when the industry was nationalized in 1947 he was appointed divisional marketing manager.

Mr. Tyson was also with Lancashire Associated Collieries and with Manchester Collieries, Limited, and Fletcher Burrows & Company. Senior regional sales officer since 1955, he was previously marketing manager No. 3 (St. Helens) Area and sales officer (house coal) for the north-western region. He was recently appointed president of the Manchester branch of the Coal Trade Benevolent Association.

Future of Mining "Boom" Town is Assured

FEARS that South Elmsall, boom town of the South Yorkshire coalfield, would become a "ghost" town have been allayed by Mr. W. F. Tunnicliffe, general manager of No. 4 (Carlton) Area of the North-Eastern Divisional Coal Board. The fears arose because 300 miners have been transferred from Frickley Colliery and because the Barnsley Seam, main source of output since the pit was opened 56 years ago, is nearly worked out.

In a statement last Friday, Mr. Tunnicliffe gave an assurance that Frickley, one of the biggest collieries in the country, with 3,500 workers, was in no danger of becoming derelict. "We are planning to tap the Beamshaw, Melton Field, and Winter seams, which are above the three seams already being worked and which have at least 50 years' life," he said. "Lower down are the Parkgate, Thorncliffe, and Fenton seams, all of high grade coal, which are sufficient to last for 200 years. Nobody need fear about the future of Frickley Colliery."

Sir Joseph Latham to Speak at Scottish BIM Conference

DEPUTY chairman of the National Coal Board, Sir Joseph Latham, will give the opening address at the Scottish conference of the British Institute of Management at Gleneagles on April 29 and 30. In his address, Sir Joseph will introduce the general theme of the conference, "Management Problems in an Expanding Economy."

Other speakers will include Dr. J. L. Putman, acting head, isotope division, Atomic Energy Research Establishment, Atomic Energy Authority, and Prof. R. Browning, Professor of Accountancy, University of Glasgow. The address at the closing dinner will be given by Lord Verulam, chairman of BIM.

In Parliament

SMALL MINES

NCB Reaches Agreement with Federation

REVEALING that agreement had been reached between the National Coal Board and the leaders of the Small Mines Federation, MR. RICHARD WOOD, Minister of Power, refused to go further in committing his Ministry or the board on the future of the small privately licensed mines, in spite of a barrage of questions from both sides of the House. Statutory responsibility rested with the Coal Board, he said, and it must settle the level of activity in this sector of the industry.

Framed as questions MR. ALAN FITCH (Lab.) managed to make a number of points. Privately owned mines bore none of the loss involved in former imports of US coal; at that time such owners exported 1,000,000 tons of coal at 25s. a ton more than could be realized on the home market; men dismissed from private mines and now found work with the NCB were enjoying privileges they never got under private enterprise.

MR. RAYMOND GOWER (Con.), who was told there were about 2,850 employed in small mines in England and 1,900 in Wales, on March 26, said they were producing coal economically and employing large numbers of men. Increased royalties were extortionate and the cut-back in production unreasonable.

Had the Minister no comment to make about the massive disruption of the small mines by the NCB? MR. STEPHEN DAVIES (Lab.) asked, adding that he would raise the matter again.

Questions on Steel Imports

AFTER being given the most recent figures on steel imports into the UK. MR. FREDERICK LEE (Lab.) asked why the British steel industry had not managed to keep abreast of suggestions for its expansion, and accused the Government of being "bent upon disrupting a great nationalized section" of the industry. MR. RICHARD WOOD, Minister of Power, said the Government had merely given loans which were intended to meet precisely the shortage to which Mr. Lee had referred.

Answering Mr. Lee earlier, the MINISTER said that steel imports in January and February were 112,000 tons against 33,419 tons in the corresponding period last year. Imports of sheet and coil for re-rolling accounted for about 94,000 tons of the total of 112,000 tons.

In another answer to a question by Mr. Lee, the MINISTER said that the Iron and Steel Board had had a few reports from users about shortages of supplies of cold-rolled strip, wire rod, and certain types of billet. The board expected output of these products to increase sufficiently during the year to match the expected increase in consumption. He could not say without notice which firms would increase their output, but the additional output this year of the three products he had mentioned was likely to vary between 15 and 23 per cent.

Asked by MR. GEORGE CHETWYND (Lab.) how far the shortage was being artificially created through stockholders building up stocks for future use to obtain higher prices, the Minister said there might be some of that element in it, but it was difficult to be precise.

Apprentice Training Scheme Announced

A SMALL number of classes in Government training centres are to be set up to provide first-year apprentice training, said MR. EDWARD HEATH, Minister of Labour. He added that the training would be given only to boys accepted as apprentices by firms. Preference would be given to boys from firms which were either unable to undertake apprentice training or to increase their present number of apprentices.

The training would be free of charge, but employers taking part in the scheme would be required to give an undertaking to pay the wages of apprentices during the year and to continue the boys' training afterwards under normal industrial arrangements.

"This scheme has been approved as a whole by the British Employers' Confederation and the Trade Union Congress," he said. "The establishment of classes in engineering has been agreed by employers and trade unions in that industry." The first training places would be available early this summer at eight Government centres and he expected to set up classes at other centres later this year, making a total of about 300 training places.

COAL STOCKS

REPLYING to MR. DAVID GINSBURG (Lab.), the MINISTER OF POWER, Mr. Richard Wood, said that the reduction in coal stocks by 3,000,000 tons to 32,700,000 tons since January 1 was up to expectation. He would, however, like to see a further reduction.

Coal from stock had been sold by the NCB at a variety of prices according to its quality and size. Separate figures were not available, he said, but the coal had been sold quality for quality at the same prices as coal from current production. The board considered that the experience gained in stocking and selling this coal confirmed the adequacy of the allowances for the cost of stocking which it made in its published accounts.

A question on stocks is not allowed to pass by MR. GERALD NABARRO (Con.). Replying, MR. WOOD said that on March 26 the NCB held 32,700,000 tons of coal and 5,000,000 tons of coke, valued at about £130,000,000. The valuation compared with a figure

of about £140,000,000 at November 1, 1959. Between now and November 1, 1960, the position would be affected by seasonal stocking, but he expected the estimate of a net stock lift of about 1,000,000 tons during the year as a whole would be fulfilled.

The figures revealed that almost throughout the year the taxpayers would be maintaining a stock of £125,000,000 worth of coal and coke, undistributed, unsold, and perhaps unsaleable by the board, said Mr. Nabarro.

MR. WOOD: "I think they probably do."

MR. NABARRO: "Thank you very much."

COAL EXPORTS TO DENMARK

NO difficulty is experienced by the National Coal Board in meeting Danish requirements apart from one or two grades in which there are seasonal shortages, said MR. RICHARD WOOD, Minister of Power, in reply to MR. GEORGE JEGER (Lab.). Despite intense competition, the Minister continued, exports have been twice as high this year as a year ago. He said he was anxious to help the board and exporters to increase their sales to Denmark.

MR. JEGER emphasized that Polish competition was seriously hitting exports to Denmark, but MR. WOOD replied that, although he was anxious to do what he could to increase exports, it was not open to him to make bilateral price agreements with Poland or any other country.

MR. ALBERT ROBERTS (Lab.) suggested that because Poland purchased a sizeable amount of capital goods from this country and because of the difficulty of Polish trade, the Board of Trade might come to some arrangement with the Polish Government to ensure it did not sell coal below the economic price. The MINISTER did not see how this suggestion would help the Poles in their difficulty in having insufficient currency for imports. He agreed to consult with the President of the Board of Trade.

CLYDE GRAVING DOCK

REQUEST for the Government's intentions on the projected Clyde graving dock was made by DR. DICKSON MABON (Lab. & Co-op.) in view of the recent conversations between the sponsors and the Development Areas Treasury Advisory Committee. MR. JOHN RODGERS, Parliamentary Secretary to the Board of Trade, said that the provisional offer to the sponsors last autumn had now been confirmed. If the sponsors proceeded with the project, financial aid would be available in accordance with terms arranged between them and the Treasury.

DR. MABON said there was a great deal of concern on his side of the House about the breakdown of the sponsors' arrangements in view of the fact that the Treasury raised the matter of guaranteed capital. "Am I to assume from the answer that the snag which was made public in January is now overcome, and that DATAC is willing to accept the sponsors' *bona fides* as presented to it?"

MR. RODGERS replied that the offer was conditional on satisfactory reports from Board of Trade technical advisers and accountants.

SCOTTISH COAL OUTPUT

WHY had there been a decline from 12 per cent. in 1948 to 9¼ per cent. in 1959 in Scotland's share of the UK coal output? MR. TOM FRASER (Lab.) asked. There had been a serious drop in productivity in Scotland, MR. JOHN C. GEORGE, Parliamentary Secretary to the Ministry of Power, replied. Whereas there had been an increase of 1½ per cent. in England and Wales, there had been a decrease in Scotland between 1948 and 1959 of 21 per cent. in output.

It was not a question of manpower nor closing of mines. In 1948 in Scotland 81,400 men produced 23,800,000 tons of coal and in 1959 81,000 men were still employed, but produced only 18,900,000 tons.

He agreed that every effort should be expended in order to bring industry into mining areas where there was likely to be unemployment, but, MR. GEORGE said, it must be recognized that in Scotland the NCB had been investing capital at a rate greater than Scotland's share of production. That capital expenditure must in the end show results and would eventually lead to fewer being unemployed.

FUEL OIL IMPORTS

SAYING that imports of fuel oil for the first two months of this year were nearly double those in the corresponding period last year, Mr. WOODROW WYATT (Lab.) asked the Minister of Power what measures he proposed to take to reduce this because of the danger to the coal industry and the balance of payments.

The MINISTER replied: "None, sir. In this period, home refining, the main source of our fuel oil, showed an increase over the previous year. Fuel oil exports and bunkers were also up, and there are signs of a recovery in the demand for coal."

He intended to keep a watch on the position, but could not agree that this would be the time to take any action to curb imports, particularly in view of the coal situation.

THE HOUSE adjourned yesterday (Thursday) for the Easter recess until April 26.

DID THE MINISTER intend adopting the precedent of the railways for the National Coal Board so that there was a subsidy for coal stocks as well as the railways, Mr. Gerald Nabarro asked. Accumulated losses were at present financed by the NCB, the Minister of Power replied. He preferred not to speculate about the future.

IN A WRITTEN ANSWER to Mr. William Hamilton (Lab.), the Parliamentary Secretary to the Ministry of Power said that use of liquid fuels for burning purposes by larger industrial consumers was: Scotland, 140,000 tons in 1949 and 590,000 tons in 1959; Great Britain 2,200,000 tons and 7,300,000 tons respectively. Scotland's share had increased from 6.4 per cent. to 8.1 per cent.

Collieries Accused of River Taff Pollution

DRASTIC action to remedy pollution of the River Taff was urged by members of the Glamorgan River Board Pollution Prevention and Fisheries Committee at a Cardiff meeting. One speaker accused the National Coal Board of giving the "same stock arguments and reasons" whenever it was approached about pollution by colliery effluents.

Mr. A. H. Williams, chief pollution prevention officer, said he had met NCB scientific officers. A monthly survey was being made of the Taff, and the River Board's annual report would show an improvement in the state of the river. He said that an analysis of colliery washery effluents revealed a lower percentage of unsatisfactory results in 1959-60, compared with the previous year.

Law Cases

PHENOL PRICE-FIXING

"Contrary to Public Interest"

PRICE-FIXING agreement among members of the Phenol Producers' Association was discontinued by the Restrictive Practices Court in London and declared contrary to the public interest. Reading the reserved judgment of the Court, Mr. Justice Pearson said that the rigidity of the fixed price and its ancillary terms and conditions was a disadvantage to purchasers. The association has among its membership several area gas boards which are the principal suppliers of the tar from which phenol and other chemicals are obtained. Most of the by-products are used by the plastics industry.

Some producers of synthetic phenol not in the association, the Judge said, were making some sales below the fixed price. No sufficient evidence had been given of any world-wide oversupply of phenol, or of any difficulty of disposal of British-made phenol in the export market. The Court was of the opinion that the removal of the restrictions would not deny to the public any benefit or advantage.

Mr. Justice Pearson said that when coal was subjected to dry distillation, five primary products were produced: gas, coke, ammonia, liquor, benzene, and coal tar. The dry distillation of coal was undertaken by two main industries, the gas and steel industries. Steel industry coal tar had a negligible proportion of phenol content, but a high proportion of naphthalene, a very valuable chemical of which there was a world-wide shortage. Conversely, gas industry coal tar had a higher phenol content, but a low naphthalene content.

"The Real Factor"

The association's fixed basic price at present was 1s. 4d. per lb. for contracts for 10 tons and over of phenol for delivery in the seller's road or rail tanks. The price was not fixed by reference to the costs of production. The association's secretary, the judge continued, agreed in his evidence that the real factor in fixing the price was the gauging of what price the trade would stand, and the chairman, when asked whether the system was "opportunism tempered by a collective sense of caution," replied "that puts it very nicely."

The judge said there appeared to be four main detriments of the scheme:—The fixed price was above the price which would be obtained in a free market; it was not related to costs of production, but the fixing of it was left to the unfettered discretion of the members; the policy of the association had been to "charge what the traffic would bear" and the customers' interests were regarded because the producers did not wish to spoil their market by charging too high prices; lastly, the scheme was rigid and without concessions to persons engaged in exports, to buyers wishing to buy on a long-term contract or to place large-scale orders. The association sought to meet these detriments of the scheme and show it possessed some special advantage for the public by saying that if the scheme were abolished there would be large diversion from distillation of tar acids to burning them as fuel.

On behalf of the association, Mr. D. A. Grant gave an undertaking not to enforce the agreement, or to enter into any new agreement without informing the Registrar of Restrictive Trading Agreements.

Judicial Conflict Over Disablement Gratuity

APPEAL against a judgment of Mr. Justice Finnemore at Lewes Assizes by Mr. Thomas Moffat Hultquist, milling machine operator, who lost his right index finger in a works accident, was allowed by the Court of Appeal. Their Lordships held that in calculating damages suffered by an injured workman half of the whole of a lump sum disablement gratuity granted to him should not have been deducted. The action was against Mr. Hultquist's employers, Universal Pattern & Precision Engineering Company, Limited, of Crawley. Liability was admitted by the employers.

In a reserved judgment, Lord Justice Sellers said a judicial controversy had arisen over the deductions which had to be made from the special damage claimed by the plaintiff for loss of wages—the disablement gratuity of £210 resulting from his loss of faculty assessed at 14 per cent. for life. This was a final assessment.

The plaintiff submitted it was erroneous to take into account half the gratuity of £210 because that sum was not an industrial disablement benefit for the five years beginning with the time when the cause of the action accrued, but was a gratuity for life.

Lord Sellers thought that the appeal should be allowed and the credit reduced from £105 to £15. The total damages for which judgment should be entered would therefore be £702 7s. 9d. As that was more than the £700 paid into court the plaintiff was entitled to the cost of the trial in substitution for the judge's order. Lords Justices Ormerod and Upjohn concurred.

Slag "Could Not be Stolen"

WHEN five unemployed men were charged at North Riding Quarter Sessions of the theft of scarry scrap from a dump near the Cleveland works of Dorman Long & Company, Limited, it was successfully

submitted on their behalf that the scrap had merged with the land and could not be held to be the chattels of any person and therefore could not be stolen.

The chairman, Mr. P. Stanley-Price, was told that millions of tons of slag from steelworks built up the dump between 1870 and 1924. The submission was upheld and the jury formally returned verdicts of Not Guilty. The men were discharged.

It was alleged by the prosecution that the scrap was contained in tippings from blast furnaces in which iron ore was smelted. The tip was quite open and in December a policeman saw two of the accused on the tip and told them they must not take scrap. Later arrangements were made with a Middlesbrough company to sell scrap and all five men worked openly for several weeks recovering metal and selling it for £6 a ton.

The men were Mr. William Henry Croft, Mr. Patrick Daniels, Mr. Desmond Croucher, Mr. Patrick Cairns, and Mr. Bernard Cairns.

Research Works Not An Industrial Hereditament

PREMISES described as offices and a research establishment belonging to Harry Ferguson Research, Limited, at Baginton (Warwickshire), were not entitled to the benefit of industrial derating since they were not an "industrial hereditament," it was held in the Court of Appeal, which allowed an appeal by a valuation officer from a decision of the Lands Tribunal.

Lord Justice Hodson said that the hereditament was a factory type of building taken by the company since 1956 for the development of a revolutionary type of vehicle. The fact that something was being made there gave the premises a factory flavour and it was conceded that the premises were a "factory" for other purposes. The Lands Tribunal had found, first, that the object of the work done there was the construction of prototypes and parts therefor, and the testing of them for the purposes of finding out whether an idea was good and practical, and the only product of the premises was a prototype and parts therefor.

The tribunal further found that the receipts of the company arose wholly from payments made by its parent company, which were made not to finance research as such, but to enable research to be carried out with the object of placing either a new type of vehicle, or a new type of component, on the market.

It seemed to the tribunal that the work done was by way of trade or for the purposes of gain, although these were indirect, and nothing came out of the factory which was immediately saleable to the general public. His Lordship did not think the question of ultimate gain was relevant to the question. The decision which the tribunal finally reached was inconsistent with its first finding and for this part he would allow the appeal. Lords Justices Willmer and Devlin concurred.

PAY CLERK FOR TRIAL

BY a series of frauds over 11 years, a 35-year-old wages clerk had swindled his firm out of £12,589, it was alleged at Guisborough (Yorkshire). The accused, Clarence Cottler, who, it was stated, had stolen 407 wage packets at the iron foundry of Blackett, Hutton & Company, Limited, Guisborough, was committed for trial at North Riding Quarter Sessions. Cottler faced 20 charges of stealing money and insurance stamps and making false entries. The money involved in these charges was £364.

Cottler was alleged to have worked a fraud by stamping the workmen's cards and falsifying the firm's books to show that the men were working when they were not. He had made up false wage packets from the petty cash with the men's correct wages in them, it was alleged.

"FANTASY" COMMENT

STEEL firm's theory of the cause of a factory accident bordered on the realms of fantasy, said Mr. Commissioner Mocatta in a reserved judgment at Birmingham Assizes. Mr. Thomas Vale was awarded damages of £695, including special damages of £95, against his employers, Reynold Tube Company, Limited, of Birmingham.

Mr. Vale received shoulder and rib injuries when tubes, which were being hoisted by a crane, slipped and fell on him. The Commissioner said that the real allegation of negligence against the company was that the crane driver by mistake moved the "tilt" instead of the "traverse" lever, causing the tubes to fall. The defendant's case was that the accident was caused by the failure of Mr. Vale to see that the load was secure before he gave the signal to the crane driver to begin traversing. Because of this, it was contended, the crane sling had caught on a hook.

He said that if, as the firm had agreed, the chances of this happening were a million to one, the odds against the sling remaining on the hook while the crane continued its movement were so great as to border on fantasy. "I have to choose between something bordering on fantasy on the one hand, and a not impossible mistake by the crane driver on the other," the Commissioner said. The company was granted a stay of execution for 21 days for an appeal to be considered.

RIGGER AWARDED £170

RIGGER who lost the tip of a finger as the result of a works accident was awarded £170 damages against the Guest Keen Iron & Steel Company, Limited, at Cardiff County Court. The plaintiff, Mr. Stanley Edward Downs (43), was moving a section of a brick conveyor in the coke oven department with two other men. It was mounted on a bogey and at the end of its journey the workmen found it had slewed round. Mr. Downs crushed his finger in an attempt to straighten it out.

Judge O. Temple-Morris, QC, said the company was negligent in that it failed to allow a crane to be used to move the conveyor. He also found Mr. Downs guilty of contributory negligence because he failed to lash the conveyor to the bogey.

£300 FOR FINGER-TIP LOSS

WOMAN whose finger-tip was crushed by a moving rod on the machine she was operating at the Tremorfa works of Nettlefold-Stenman Hinges, Limited, was awarded £300 damages at Glamorgan Assizes for what Mr. Justice Phillimore described as "a small but unpleasant permanent disfigurement." The plaintiff was Miss Louisa Mary Joyce Francis (37), who lost the tip of her right finger after the accident.

The judge ruled that Miss Francis must bear a quarter of responsibility for the accident. The finger was "rather unsightly," but there was no real loss of earning capacity.

Company News

Electronics in the Warehouse

SOLARTRON-JOHN BROWN AUTOMATION

MECHANICAL engineering experience and skill of John Brown & Company, Limited, are allied with the electronic experience and knowledge of the Solartron Electronic Group, Limited, by the formation of a jointly owned company, Solartron-John Brown Automation, Limited, to design and manufacture systems of automation for industry in the manufacturing, distributive, and consumer fields. The new company has the complete exploitation rights for the Gumpertz automatic warehousing system for all countries outside America.

Under this system, instead of bins and shelving, the warehouse is fitted out with rows of steeply slanting shelves, one behind the other. Each shelf, which can rise to the height of many feet, carries a single layer of one product "line." A barrier at the lower end of the shelf, when electro-mechanically operated, allows a single or any required number of articles to drop on to an endless belt, which feeds on to a main conveyor belt. The barriers at the ends of the feeding belts are controlled by impulses generated in the electronic system by the reading of a card.

The system will work in conjunction with any known system of office mechanization. In America it is being used in warehouses supplying consumer goods to supermarkets, but it can be supplied wherever a wide variety of goods or products is required to fill separate orders.

The new company has its offices at 20, Eastbourne Terrace, London, W.2.

ENGLISH ABRASIVES CORPORATION, LIMITED—Group net profits rose from £43,582 to £93,555 in 1959, and the dividend is increased to 8 (5) per cent.

DARWINS, LIMITED—Trading profits were £444,217 (£350,565), with tax taking £145,400 (£121,400). The final dividend is 8½ per cent., bringing the final to 12½ (10) per cent.

WM. SANDERS & COMPANY (WEDNESBURY), LIMITED, manufacturing electrical engineers—Net profits were £35,908 (£31,393), before tax of £17,718 (£15,572), and the dividend is raised to 25 (20) per cent.

HARPER ENGINEERING & ELECTRONICS, LIMITED—Contracts have been exchanged with J. B. & S. Lees, Limited, steel strip manufacturers, of West Bromwich, and it is to join the Harper group shortly.

RICHARD CRITTALL & COMPANY, LIMITED, heating, ventilating and air conditioning engineers, of London, W.1—Group net profit for 1959 was £141,055 (£140,407), and the dividend is 22½ (17½) per cent.

CAIRD & RAYNER, LIMITED, marine engineers, etc., of London, E.14—Net profit fell from £66,439 to £33,565 in 1959 after tax of £22,739 (£70,747). The dividend is 13½ per cent., against 13½ per cent. equivalent for 1958.

SIR WILLIAM ARROL & COMPANY, LIMITED, bridge builders and engineers, etc., of Glasgow—The less tax dividend is raised by 5 per cent. to 20 per cent. for 1959, with a 12½ per cent. final. Holders also received a 3½ per cent. payment from capital profits a year ago. A one-for-one scrip issue is proposed to holders of the £593,400 ordinary capital. After all charges, including tax, profits increased from £216,559 to £292,514.

BRITISH PETROLEUM COMPANY, LIMITED—A final dividend of 1s. 6d. per ordinary £1 unit, tax free, making 2s. 2d. net per unit for 1959 is announced, compared with 1s. 9d. net for the previous year when there was a 100 per cent. scrip issue.

VOSPER, LIMITED, shipbuilders' engineers, of Portsmouth—A loss of £14,773 was incurred for the year, compared with a profit of £45,072 for the sixteen months ended December 31, 1958. The dividend is 10 per cent. (20 per cent. for the period).

BREEDON & CLOUD HILL LIME WORKS, LIMITED—A final dividend of 25 per cent. brings the total to 40 per cent., against a total of 30 per cent. and a special interim of 10 per cent. for last year. Net profits were £92,615 (£81,633), after tax of £91,061 (£83,220).

F. PERKINS, LIMITED, diesel engine manufacturers, of Peterborough—Group net profit for the ten months to October 31, 1959, is £1,092,407 (£375,265), after tax of £919,342 (£120,377). As in 1957 and 1958, no final dividend on the ordinary is recommended.

THOS. C. KEAY, LIMITED, textile engineers, etc., of Dundee—A final dividend of 10 per cent. makes 15 (5) per cent. for the year. Group profit of £32,768 compares with a loss of £7,273, and the net loss of £11,368 has been more than reversed to a profit of £17,002.

A.P.V. COMPANY, LIMITED, dairy, brewery, chemical, and general engineers, of Crawley (Sussex)—Group net profit was £257,960 (£159,177) and the dividend is 8½ (5) per cent. The profit, before tax, rose from £368,599 to £595,893, excluding the Brazilian subsidiary.

BOULTON & PAUL, LIMITED, structural engineers, wire-netting manufacturers, etc., of Norwich—Group net profit for the year to September 30, 1959, is £273,832 (£193,109) and the dividend of 12½ per cent. compares with 10 per cent. plus a 2½ per cent. special interim.

DAVIS & TIMMINS, LIMITED, makers of screws, nuts, and bolts, of London, E.17—The dividend is raised by 5 per cent. to 25 per cent. for 1959 with a final of 17½ per cent. and it is proposed to make a one-for-four scrip issue. Group net profit increased to £135,586 (£106,071).

CHLORIDE ELECTRICAL STORAGE COMPANY, LIMITED—Net profits rose from £899,009 to £1,473,287 in 1959 and the dividend is effectively raised from the equivalent of 13½ per cent. to 17½ per cent. on a capital increased by a one-for-two scrip issue with a final of 12½ per cent.

CHURCHILL MACHINE TOOL COMPANY, LIMITED—Net

profits were £307,619 (£344,262), after tax of £160,000 (£270,500). The dividend is the same at 2 per cent. but there is a tax-free distribution of 3 per cent. (nil) from realized capital profits reserve, bringing the final payment to 17½ (same) per cent.

KANGO ELECTRIC HAMMERS, LIMITED—Profits rose to £46,064 (£31,566) and the final dividend is 9 per cent., making a total for 1959 of 15 per cent. with a jubilee bonus of 2½ per cent. In 1958 an interim of 15 per cent. was followed by a two-for-one scrip issue and a final of 7½ per cent. on the present capital.

BECK & COMPANY (METERS), LIMITED, manufacturing engineers, etc., of London, S.W.16—All the ordinary capital of the Tuscan Engineering Company, Limited, Bridgend (Glam), has been acquired by the company, which is a subsidiary of Hattersley (Ormskirk), Limited. Mr. G. I. Payne continues as managing director of Tuscan.

LONDON BRICK COMPANY, LIMITED—The 1959 preliminary statement shows a profit (with sundry incomes) of £2,855,468 (£2,589,311) and it is proposed to capitalize £1,300,000 from reserves in a one-for-four scrip issue. Net profits, after all charges, are £1,165,065 (£960,737). Interim dividends of 20 (17) per cent. have been paid.

RANSOMES SIMS & JEFFERIES, LIMITED—The effective dividend of 7½ per cent. is maintained for 1959 on capital increased by one-for-five rights and subsequent one-for-four scrip issues. Adjusting for the capitalization, the 1958 dividend was equivalent to 6 per cent. Net balance was £406,212 (£242,405), after tax of £464,598 (£332,072).

D. I. WILLIAMS, LIMITED, public works and civil engineering contractors, of Cardiff—The receiver and manager, Mr. G. N. Metcalf, says he is approaching a point when he hopes to be able to repay the debenture holder in full and also settle the company's liability to the one remaining preferential creditor. A creditors' meeting has been called for April 26.

BRITISH ELECTRIC TRANSFORMER COMPANY, LIMITED—The company, an associate of Crompton Parkinson, Limited, has received an offer from C.P. Properties, Limited, a wholly-owned subsidiary of Crompton Parkinson, to purchase the 190,625 issued 5 per cent. cumulative preference shares of £1 each from existing holders. The offer is 20s. payable in cash for each share.

A. V. ROE, CANADA, LIMITED—Business volumes in many markets in which the company, a member of the Hawker Siddeley Group, Limited, is primarily engaged remain at unusually low levels. Most severely affected are rail equipment, airframe, and coal operations. Production of basic steels, the company states, has increased sharply in recent months, and rolling mills and plants producing bars, shapes, and wire are similarly active.

EDWARDS HIGH VACUUM, LIMITED—Group net profits rose to £145,598 from £102,521, after tax of £129,901 (£113,586). The ordinary distribution is raised to 20 (16) per cent., with a final of 14 (12) per cent. At a later date the directors intend to capitalize the sum standing to the credit of share premium account of about £300,000 arising from the conversion of 6½ per cent. loan stock last February, by a scrip issue to the ordinary shareholders.

DUNDEE COAL COMPANY, LIMITED—The chairman, Mr. W. B. Collier, states that in spite of keen competition, the company has secured orders for the export of pitch which will take care of production until September, including the balance of about 2,000 tons from the dump. Future business will therefore be confined to the limited quantities available from production. Contracts have been obtained which will absorb the whole of the company's production of hot pressed naphthalene for 1960.

SOUTH DURHAM STEEL & IRON COMPANY, LIMITED—The company states that 1,792 holders of the 6 per cent. convertible second debenture stock 1978/83 exercised their conversion rights during March in respect of £7,510,016 stock. The issue and allotment of 3,755,008 ordinary shares of £1 each is being proceeded with accordingly and 6 per cent. debenture stock certificates to the value of £3,755,008, with no further conversion rights attached thereto, will be posted on or before tomorrow (Saturday).

JOSEPH SHAKESPEARE & COMPANY, LIMITED, manufacturers of drop forgings, chains, railway carriage fittings, etc., of Old Hill (Staffs)—Mr. John W. Shakespeare, chairman and managing director, states that the company was very much geared up with the modernization plans of the railways, its order books overflowed, and prospects were very good. Unfortunately, almost overnight, much of the modernization programme was suspended and in one week alone the company had orders and potential orders to the value of more than £250,000 cancelled. Consolidated net profit is £19,707 (£40,760).

W. H. DORMAN & COMPANY, LIMITED, engineers, etc., of Stafford—Insufficient proxies (64,636 votes in favour and 34,179 against) were received at a meeting of preference holders regarding a proposal that the £400,000 loan, secured by a debenture, and a £79,000 overdraft at March 14, 1960, should be replaced by a more permanent form of finance. At a future date, the board will bring forward more specific proposals for funding the bank loan "so that we may take advantage of the increasing prosperity of the company which would then be reflected in the Stock Exchange quotation for each class of share," said the chairman, Mr. D. Haddon.

FRANCIS SHAW & COMPANY, LIMITED, makers of machinery for the rubber and plastics industries, of Manchester—To finance the expansion of home and oversea business and the recent purchase of Joseph Robinson & Company (Holdings), Limited, it is proposed to raise £450,000 by the issue of 300,000 ordinary 4s. shares and £300,000 6½ per cent. convertible unsecured loan, 1975-80. The ordinary shares and loan stock will be offered to holders in units comprising one ordinary share and £1 loan stock at 30s., a unit in the proportion of one unit for every ten ordinary shares held. Group profit for 1959 was £433,705 (£295,678) after tax of £222,000 (£121,000), and the final dividend is 12½ per cent., making 20 per cent. (17½ per cent. including 2½ per cent. special interim).

FLEMING/B.A.O. GROUP FORMS NEW COMPANY

FORMATION of Optoshield, Limited, London, E.C.1, by the Fleming/B.A.O. group of companies is designed to widen the range of products handled and to market all articles manufactured by the group which are intended for industrial consumption through the one subsidiary. The company is a development of the safety division of J. & R. Fleming, Limited, well known particularly for the manufacture of industrial eye-protective equipment.

The board of Optoshield is as follows:— Chairman, Mr. John Adamson: Sir Leonard Sinclair, Mr. Milton R. Pyke, Mr. R. Angus Fleming, Mr. John A. Fleming, and Mr. Edmund W. Worth. Mr. C. J. Williams has been appointed general sales manager and the safety sales manager is Miss B. P. Park.

IRON AND STEEL TRADE

AFFECTING as they do the prices of about 1,500,000 tons of special steels, the revised schedules which came into operation on Monday are by no means negligible. Embracing both advances and reductions and intended to bring prices into closer aligment with costs of production in the more modern plants, these changes have given rise to speculations concerning the possibility of a revision of the maximum price schedules on a wider front.

The financial position of the steel companies has undoubtedly been strengthened by the attainment of full employment and consumers' hopes are founded upon the rising insistence upon narrower output margins and an industry which is directly amenable to Government influence.

Trading activity is maintained at a high pitch and production in the second quarter promises to equal and possibly to exceed the record of the first three months of the year.

Pig-iron

Pig-iron production continues to rise. Makers of iron castings still remain on the outer fringe of the industrial revival and their requisitions for foundry iron are easily satisfied, leaving blastfurnacemen and merchants with substantial margins.

Supplies of basic iron for the open hearths are running short, however, and their further expansion ranks among the more urgent necessities.

Ferro-alloys

The demand for ferro-tungsten shows little change, and the price is also unaltered. Ferro-vanadium is receiving moderate support, and ferro-molybdenum is in fair request. Both the high and low carbon grades of ferro-chrome are of moderate interest, and ferro-silicon is quite active. Reasonable attention is given to calcium silicide, and there is a good demand for ferro-manganese.

There is a steady call on supplies of ferro-niobium, while ferro-titanium remains an active feature. Chromium metal is fairly active.

Semi-finished Steel

The spectacular rise in the requirements of the re-rolling industry has imposed a heavy strain on the makers of semi-finished steel in all its varied forms. In 12 months, deliveries have increased by about 34 per cent.

Even this is not enough and not inconsiderable tonnages are now being imported to bridge the gap until capacity is further increased.

Finished Steel

Producers of nearly all finished steel products, from light bars, wire and reinforcing rods to heavy structural material such as joists, beams, and sections are working to the limit of their capacity and the Easter holidays will be more honoured in the breach than in the observance.

There is one unhappy exception. Owing to trouble in the melting shops shift working of some of the Dorman Long rolling mills has been temporarily reduced. On the other hand the steel furnaces at the new South Durham Steel & Iron plant are scheduled to begin pouring in August next and further expansion of rolling mill capacity is planned for the autumn.

Steel, Peech & Tozer to Install APIC

AUTOMATIC power input controller (APIC) designed by the British Iron and Steel Research Association, is to be installed by Steel Peech & Tozer branch of the United Steel Companies, Limited, on its 5-ton furnace. APIC works the furnace according to a controlled programme of time and roof temperatures.

The equipment consists primarily of a synchronous electric timer and devices which continuously measure the temperature, and rate of temperature change, of the roof refractories. When the information relayed by these instruments indicates that a particular stage of melting has been reached, the controller selects the appropriate voltage for the next stage of the programme.

The company has used the prototype APIC on a continuously operated 5-ton arc furnace. A three weeks' trial under observed technical control, followed by a further two months' trial under normal operating conditions, has shown reduced electricity consumption, improved melting rate, and some indication of a reduction in roof wear. The company is now building an APIC for permanent use so that the prototype can be released for trials at other works.

The use of large electric arc furnaces for the bulk production of steel is increasing and the company announced recently that its 21 open hearth furnaces are to be replaced by six 110-ton electric arc furnaces. This will be the largest electric steelmaking plant in the world.

Assistant General Manager of N. J. Muschamp

NEW assistant general manager of N. J. Muschamp & Company, Limited, mining engineers, etc., of Mansfield (Notts), is Mr. John French. He graduated from Leeds University in 1950 as a B.Sc. and became an associate member of the Institution of Mining Engineers two years later.

Before joining N. J. Muschamp & Company, Mr. French was manager of the Sherwood and Warsop Main Colleries in the Edwinstowe Area of the East Midlands Divisional Coal Board. He served with the RAF throughout the last war.

MIDLAND GROUP of the Central Electricity Generating Board has placed an order worth about £375,000 with the Harland Engineering Company, Limited, of Alloa, for four groups of boiler feed pump sets for the Drakelow "C" power station.

End of Miners' "Bull" Weeks?

OUTPUT of deep-mined coal seems to have settled down to such a steady rate of production that the days of the "bull" week before a public holiday are over. Last week's "bull" week total was 3,968,600 tons, only 33,000 tons above the previous week and 30,986 tons above the average weekly figure for 1960. This was an additional effort of less than 1 per cent.

Smaller and smaller coal stocks are being held by industry, the services, and merchants and in the week ended April 2 the total dropped to 12,005,000 tons. Undistributed stocks have started to climb again and at 32,798,000 tons are 81,000 tons up on the previous week. There was also an all round drop in consumption.

There were 614,800 wage-earners on colliery books on April 2, against 671,200 on April 4, 1959, the numbers engaged at the coal face being 236,000 and 261,400, respectively. Total absenteeism (all workers) in the week ended April 2 was 14.95 per cent., compared with 16.48 per cent. in the week ended April 4, 1959. Output at the face was 4.017 tons and overall 1.428 in the week ended April 2, compared with 3.588 and 1.256 tons in the week ended April 4.

The following table gives (in tons) the output of saleable mined coal by division in the week ended April 9, and the tonnage lost through all causes (holidays, disputes, and go-slows):—

Division.	Week ended April 9, 1960.		Week ended April 11, 1959.
	Total output.	Tonnage lost.	Total output.
Scottish	369,100	4,500	390,300
Northern (N&C) ..	243,600	—	265,300
Durham	471,700	—	486,500
North-Eastern ..	864,500	21,200	900,200
North-Western ..	277,600	1,200	299,100
East Midlands ..	941,200	300	944,900
West Midlands ..	304,800	200	330,000
South-Western ..	414,800	5,700	427,300
South-Eastern ..	31,400	100	33,200
Great Britain—			
Deep-mined coal ..	3,918,700	33,200	4,076,800
Other deep-mined (including licensed mines) ..	49,900	—	56,400
Open-cast coal ..	161,800	—	244,700
TOTAL	4,130,400	33,200	4,377,900

Mr. L. Wormald Elected Mine Deputies' Leader

NEW president of the National Association of Colliery Overmen, Deputies, and Shotfirers is Mr. L. Wormald, 45-year-old agent to the Yorkshire Area of the association. Mr. Wormald polled 193 votes against 190 gained by his rival for the presidency, Mr. William Grundy, of the North-western Area. He is a former union branch official at Wombwell Main Colliery and a full-time official for the association for 10 years.

The national presidency is not a full-time post and Mr. Wormald will continue to work as the Yorkshire agent. He succeeds as president Mr. Joseph Crawford, of Durham, who was elected general secretary when Mr. Bartholomew Walsh retired. Mr. William Derby, of Scotland, is the new vice-president.

"Greater Mechanization Means More Pit Accidents"

GREATER mechanization was the cause of the increase in the accident rate in the mining industry since nationalization, said Mr. H. Rodway, safety engineer of the Mid-Northumberland Area of the Northern (N & C) Divisional Coal Board, in an address to members of Bedlington (Northumberland) Toc H Club last week. Mr. Rodway said that the accident rate was now 10 per cent., compared with 5.2 per cent. before nationalization.

Despite elaborate training schemes for new entrants, he went on, the accident rate was still rising, and it was the older miners who were more involved. Most accidents occurred on roadways, he said. Accidents at the face had fallen because of better roof supports.

Mr. Rodway claimed that 70 per cent. of the 1,600 accidents reported in his Area last year could have been avoided. The fatalistic attitude of many miners and the inadequate training of many instructors, themselves sometimes involved in accidents, stood in the way of greater safety. Incentive and piece-work payments also caused safety rules to be neglected.

Powell Duffryn Acquires Heating Specialists

BY acquiring the share capital of Hurseal, Limited, heater manufacturers, of London, W.1, Powell Duffryn, Limited, of London, E.C.3, has taken an important step in the development of its interests in the marketing of heating and air conditioning equipment. The purchase price for the 160,000 £1 ordinary shares was 47s. 6d. a share, a total of £380,000.

Together with its subsidiary, Gulf Radiators, Limited, of Cardiff, Hurseal makes a wide range of equipment for domestic and industrial central heating.

The Hurseal board has been reconstructed. Mr. Miles Reid, a director of Powell Duffryn, has joined it as chairman in succession to Mr. R. S. Bassett, who retires. Mr. O. Keir and Mr. B. W. Wade also retire. Mr. W. H. Sharland, deputy chairman of Powell Duffryn, and Mr. R. Turner, managing director of Powell Duffryn Technical Services, Limited, join the board. Mr. A. C. Hazel will continue as managing director.

Welsh NCB Engineer Wins NIFES Prize

WELSH engineer, Mr. J. G. Roach, shift charge engineer at Bargoed Power Station in the No. 3 (Rhondda) Area of the South Western Divisional Coal Board, is to receive one of the 10 special prizes awarded by the National Industrial Fuel Efficiency Service to candidates who passed the City and Guilds of London Institute's Boiler Operator's Certificate examinations held in May and December last year. He will be presented with his prize by Sir Dennis Proctor, Permanent Secretary of the Ministry of Power, at the opening of the Fuel Efficiency Exhibition on April 27.

Mr. Roach, who is 36, is one of more than a thousand students who have passed this examination under a special system of training set up by the NCB seven years ago.

THE COAL TRADE

LOOKING back over the past winter most merchants can claim to have done better business than in the comparable period of 1958-59 and although the slackening in trade is only to be expected, there is a good deal of confidence that the public is becoming more aware of the wisdom of keeping plentiful stocks and that summer prices will see a resurgence of demand. As the call for the scarcer varieties dwindles merchants are taking the opportunity of replenishing stocks.

YORKSHIRE

House coal trade is fairly evenly balanced between supply and demand, but it is more than likely that orders will drop off after the Easter holiday until summer prices come in. The industrial market is, however, much more lively and likely to continue so with the growth of production.

The falling-off in the demand for briquettes is seasonal, but small graded cokes are retaining some of the increased trade. Smokeless fuels keep their popularity.

DERBYSHIRE

There is a steady call for most domestic coals although quantities ordered tend to be smaller. A fair number of orders for best and hand-picked qualities are being received. The better types of screened cobbles and brights are in fair request, with the market for cheaper brights moderately brisk, and supplies readily obtainable. Best large nuts are less popular but washed medium and small nuts experience a steady inquiry, and supplies are flowing satisfactorily.

There is a steady flow of orders for domestic coke nuts and stocks are adequate for all needs. Premium smokeless fuels continue to receive considerable attention. Most grades of anthracite, especially top qualities, are difficult to come by but small supplies are fairly good. "Phurnacite" continues to be promptly available, and the market is reasonably constant.

Demand from industrial consumers is brisk and most supplies are coming forward in a satisfactory manner. Nutty slacks continue to be plentiful. Dry screened nuts are in good demand, and all current production is quickly taken up. Washed fuels are subject to steady pressure, and regular deliveries are being made in answer to all current requests. Hard steam coals are in fair supply in answer to a steady call. Most grades of hard and gas coke are promptly obtainable in answer to a slackening demand.

European Court Decision on Scrap Payments

PAYMENTS made for scrap falsely declared to the compensation fund of the European Coal and Steel Community are not to be repaid by undertakings receiving it, the European Court of Justice has decided. Payment is to be sought instead from the scrap-consuming industry as a whole.

On the same day, the court decided in favour of the High Authority of the ECSC in a case between its executive and the Italian steel concern Accierie e Tubificio di Brescia. The company had refused to supply certain information to the Authority.

Recent Wills

CADMAN, MAJOR W. H., well-known authority on carbon black £61,800

SCANTLEBURY, WILLIAM, chairman of the Metal Agencies Company, Limited, Bristol £70,786

WILSHAW, F. W., retired coal merchant, formerly of Corporation Street, Stafford £2,677

GREENE, C. J., formerly of Callender's Cable & Construction Company, Limited £73,048

TUCKER, EDWARD, a director of Beal & Son, Limited, anchor and chain makers, of Cardiff £27,826

DAVIDSON, G. S., partner in Davidson & Pearson, iron and steel agents, of London, S.W.1 ... ... £63,237

LOGIE, G. M. L., former manager of the Neptune Yard of Swan, Hunter, & Wigham Richardson, Limited £8,996

KIRKHAM, JOSEPH, joint managing director of J. & W. Kirkham, Limited, pump makers, non-ferrous founders, etc., of Bolton £159,042

KELLEHER, W. L., a director from 1916 to his retirement in 1938 of T. P. Rose Richards & Company, coal shippers, etc., of Swansea £3,777

SHAW, F. V., a director of the Dominion Machinery Company Limited, makers of woodworking machinery, etc., of Hipperholme (Yorks) ... £48,914

KEWNEY, A. L., until his retirement in 1954, joint managing director of Amos & Smith, Limited, marine engineers and shiprepairers, of Hull ... £7,323

PAYNE, ROLAND, a director of the Otley (Yorks) printers' engineers Dawson, Payne & Elliott, Limited, and grandson of the inventor of the Wharfedale printing press £28,674

DONCASTER, B. W., former chairman and great-grandson of the founder of Daniel Doncaster & Sons, Limited, dropforgers, manufacturers of forgings, hardened steel rolls, etc., of Sheffield £33,454

HAUGHTON, COL. S. G., chairman of John Kelly, Limited, Liverpool coal shippers, and vice-chairman of Musgrave & Company Limited, heating, ventilation, and mechanical engineers, of Belfast £34,721

JAMES, T. C., chairman and joint managing director of the Wolverhampton Metal Company, Limited, James Bridge Copper Works, Limited, Barton Williams & Company, Limited, and Hayes Metals (Gloucester), Limited £185,053

BURNESS, T. P. N., chairman of Ambrose Shardlow & Company, Limited, dropforgers, etc., of Sheffield, and a director of the Asquith Machine Tool Corporation, Limited, and former joint managing director of William Asquith, Limited £28,536

THORNHILL, W. T., retired works manager, late of Rubery Owen & Company, Limited, manufacturing and structural engineers, etc., of Wednesbury (Staffs), and a director of its Oldbury (Worcs) subsidiary, Hudson Brown, Limited... £37,629

Tyne Coal Shipments Improve

INCREASE in coal and coke shipments in the first quarter of the year of 26,267 tons to 1,572,331 tons is reported by the Tyne Improvement Commission. The improvement was due to a rise of 33,127 tons in the March coal shipments.

Export cargoes rose by 6,042 tons during the quarter to 172,797 tons, while coastwise shipments were up by 25,947 tons. Bunkers, however, declined by 5,362 tons to 11,348 tons. Imports showed an increase of 188,296 tons, largely accounted for by increased iron-ore and fuel oil traffic.

Coalfield News

West Midlands O.M.S. Breaks a Record

OUTPUT per manshift of 92 cwt. at the coalface and 29 cwt. overall in March represented the highest productivity figure ever achieved by the West Midlands Divisional Coal Board. This was an increase of 6.4 cwt. (7.4 per cent.) at the face and 1.8 cwt. (6.5 per cent.) overall on the corresponding period last year.

Total output was 1,559,269 tons, a reduction of 7.2 per cent. on the figure for March last year. During the first quarter, output was 4,031,643 tons, nearly 9 per cent. below the 1959 equivalent figure. At the end of the month manpower totalled 47,150, a reduction of 7,800 (14 per cent.). This was a reduction of 2,540 since January 2, including 1,100 men who retired at the age of 65. Stocks amounted to 2,860,000 tons—a drop of 131,000 tons since the end of February and 406,000 tons since the beginning of the year.

WEST WYLAM COLLIERY (Northumberland) is to be closed under the NCB's programme and 60 miners have been given notice this week.

PRESENTATIONS have been made to 12 miners from Horbury Bank Colliery (Yorks) with a total of more than 600 years' service, who have retired.

LEITH shipped 44,000 tons less coal last year than in 1958 and the port of Methil suffered a reduction in total traffic of 100,000 tons due to the decline in coal shipments.

EX-YORKSHIRE iron-ore miner, Cpl. Raymond Ward, now a regular soldier, was runner-up in a competition held on Sunday to decide the champion chef of the British Army.

"HEATING" occurred in the disused section of Littlemill Colliery (Ayr) at the week-end and NCB rescue squads sealed the pit off with 100 tons of sand. On Monday the pit was idle and 1,000 tons of production were lost.

THE FIRST AID TEAM of Dean and Chapter Colliery, Ferryhill (Co. Durham), has been chosen for duty at Westminster Abbey on the occasion of the wedding of Princess Margaret. The colliery team last year won the Prior Trophy, the premier national award for first aid.

WINNER of the junior ambulance competition held by the West Ayr Area of the Scottish Divisional Coal Board was Beoch 3/4 Colliery with 491 points. Pennyvenie 2/7 Colliery was second (417), and Auchincruive 4/5/6/7 Colliery third (412). Beoch will now compete in the Scottish Divisional Contest on May 21.

SHIPMENTS of coal, coke, and patent fuel from the port of Goole during the four weeks ended March 27 fell to 133,319 tons from 150,943 tons in the corresponding period of 1959. The total trade handled at the port rose to 204,632 tons from 200,586 tons.

LONG-SERVICE CERTIFICATES were presented to 69 retired miners at a dinner at Chatterley Whitfield Colliery by Mr. Roger Wain, a former manager at the colliery, who himself completed 50 years' mining service. Mr. William Carter had the longest record —64 years' service.

LETTERS ARE BEING SENT to the homes of Yorkshire's 130,000 miners urging them to be more "safety conscious" in the 109 pits of the county. The letter is from Mr. W. H. Sales, the chairman of the North-Eastern Divisional Coal Board, and union leaders. They have taken this step because they are concerned at the increase in deaths from accidents in the pits. Last year the division reported 68 deaths—25 more than in 1958.

SECRETARY of the Thorne branch of the NUM, Mr. Alfred Cox, presented certificates to 20 men with 50 or more years' service at the annual pensioners' treat of the Thorne divisional committee of the Coal Industries Social Welfare Organization on Saturday. Mr. H. Hartley, colliery group manager, welcomed the guests.

STRIKE of 3,500 miners at Brodsworth Main Colliery (Yorks), which brought the pit to a complete standstill and cut production by 21,000 tons, ended on Saturday when the men voted to resume work. It was claimed that men in the 308's unit of the seam were unable to earn their usual wages because of abnormal face conditions.

IDEA for a special stretcher carriage to ease the journey of a man injured underground has won first prize in the Worksop Area, North-Eastern Divisional Coal Board, safety competition and third prize in the divisional competition for its originator, Mr. Jack Harris, who has been a deputy at Thurcroft Colliery (Yorks) for the past 15 years.

PRESENTATIONS were made recently to three employees of the Scottish Divisional Coal Board on their retirement. Mr. P. Sweeny has completed 50 years' service in the industry, 30 of them in Blantyreferme Colliery. Mr. P. McNeilly has retired from the same colliery after 30 years there, and Mr. H. Brown, colliery wages clerk at Seaforth, has completed 51 years' service.

PIT CLOSURES in the Heanor (Notts) area are occurring sooner than expected, but there is no immediate threat of unemployment, states the local employment exchange. There is a considerable movement of men between pits in the area and of some underground workers to neighbouring coalfields. Skilled electricians, and boys for underground mining and for craft apprentice training are, however, still needed locally.

Durham Factory Plan for Disabled Miners

DISCUSSIONS are taking place between the Durham Divisional Coal Board and Remploy, Limited, for the establishment of a factory, possibly at Spennymoor, to employ 50 disabled miners on the repair of steel props. Mr. Sam Watson, Durham Area secretary of the NUM, said at the weekend that Remploy was prepared to recommend the establishment of a factory capable of dealing with between 500 and 600 props a week.

The question of rehabilitating injured workmen was raised in Durham at a meeting of Durham Miners' Council. Mr. Watson said afterwards it was felt that because of the contraction in production in the coalfield, the problem of finding work for disabled men was becoming quite serious.

ELEVEN EUROPEAN COUNTRIES attended the European Carbon Black Conference, which opened in London on Tuesday. Organized by the Columbian Carbon Company, it is the first conference to be held in Europe since the company announced the construction of two major production plants on the Continent. The company will open a £25,000,000 plant in Holland this spring and a £60,000,000 plant in Italy in the autumn.

Sales Drive for Oversea Coal Markets

"BUY British coal" is the theme addressed to oversea markets in a richly illustrated brochure just issued by the British Coal Exporters' Federation. The brochure declares: "The British coal producer has always had a well deserved reputation for fair play, which the Coal Board has consistently maintained. During the inevitable ups and downs of international coal trading in recent years, many customers have been able to turn to the British coal producer for help and support and have had the benefit of many useful concessions at the various turns of the market.

"The individual and flexible treatment which has been traditional in the British coal export trade must be of great value to oversea buyers. With all its natural advantages, plus skill in transport and handling, commercial expertise and working experience, British coal has little to fear and much to expect from the future."

There is praise for the British coal exporter, who has "the considerable advantage of having handled British coal from the same collieries, over the same transport systems to the same importers and receivers, on an unparalleled scale." The brochure describes this as a traditional advantage which is naturally reflected in terms of benefits to the customer.

"The buyer who deals with a British coal exporter has all the details of the transaction at his fingertips," the brochure goes on. "Those who buy British coal have access to the finest commercial coal-handling machine in Europe. British coal exporters are proud to sell British coal—and they give that coal the first-class service it deserves."

Charges for all transport services are described as reasonable and contribute substantially to the cheapness of UK coal delivered to Western Europe, when compared with the cost of competing coal from inland producers on the Continent. "For all these reasons the exporter knows he can be sure of giving his oversea customers the advantages of speed, low cost, and individual attention—the hallmarks of efficient rail and port operation."

In the section on shipping, the brochure admits that British shipping does not claim exclusive or overwhelming advantages in international traffic. "Some oversea coal purchasers have their own ships—others have long-established connection with Continental shipowners. And in the flow of coal across the seas to Europe there is need—and room—for competition and enterprise if efficiency and economy are to be kept at peak. In this free competition British shipowners are confident that they will maintain and improve their reputation and, by giving oversea customers the full commercial benefits of seaborne transport at its best, provide yet another reason for buying coal from Britain."

MINISTER OF TRANSPORT, Mr. Ernest Marples, opened the new north passenger bridge at New Brighton Ferry landing-stage, Wallasey (Ches), last Friday. The bridge was built by the Butterley Company, Limited, Derby, and Mr. Marples was introduced to Mr. M. F. M. Wright, chairman of the company, and the joint managing directors, Mr. N. R. Newman and Mr. R. Hemon. He also met the foreman erector, Mr. J. Hodgkins, and members of the construction team.

Secretary of Five Indian Government Committees

SECRETARY of the new committee appointed by the Indian Government to assess the needs of the mining industry for safety equipment and materials is Mr. G. S. Marwaha, a Government regional inspector of mines. He has also been appointed secretary of four other technical committees appointed by the Government on ventilation and lighting standards, problems of dust in mines, training schemes, and safety education.

MR. G. S. MARWAHA

Mr. Marwaha, who is 34, received his mining education at the Indian School of Mines and as a post-graduate student studied at Birmingham University from 1947 until 1950. On his return to India, he joined the department of mines as a junior inspector. In 1954, he became the youngest person in the history of the department to become an inspector of mines, and two years later, at the age of 30, he became the youngest-ever regional inspector of mines.

Mr. Marwaha is a member of the Institution of Mining Engineers, the Institution of Mining and Metallurgy, the Institution of Engineers (India), and the National Association of Colliery Managers. He is also a Fellow of the Geological, Mining, and Metallurgical Society of India, and a local honorary secretary of the Mining, Geological and Metallurgical Institute of India.

Simon Group Announces Dividends

DIRECTORS of Simon-Carves, Limited, and of Henry Simon (Holdings), Limited, refer to the proposed merger of the companies in their recommendations of a final dividend of 25 per cent., making 35 per cent. less tax, for the year. The boards recall the announced intention of the two companies, after a merger, to distribute in dividend a higher proportion of the combined profits than either company had distributed in the past.

The recommendation was in expectation of the merger and was the first stage in the implementation of this policy.

The 1958 (less tax) total of Simon-Carves was 25 per cent., and holders also received for that year a special 7½ per cent. distribution from realized capital profits.

Henry Simon (Holdings), which paid 20 per cent. (less tax) for 1958, also made a special distribution of 10 per cent. from capital profits last month, against 7½ per cent. a year before.

The announcement last month of the agreement for a merger said the exact terms must await the final 1959 results of both companies. Shareholders are expected to receive details of the merger within the next six weeks.

Orders Placed

Oxygen-fed Scarfing Machines for New Steel Plants

NEW oxygen-fed hot scarfing machines are to be installed at the new Ravenscraig works of Colvilles, Limited, and the new Spencer works at Llanwern (Mon), of Richard Thomas & Baldwins, Limited. The equipment, worth more than £350,000. and the oxygen to operate the machinery will be supplied by British Oxygen Gases, Limited, of London, S.W.1.

Provision has been made at Ravenscraig to install a carriage unit to support the largest type of machines for scarfing all faces simultaneously, handling widths of more than 7 ft. and thicknesses of nearly 2 ft. The equipment is manufactured by the Union Carbide International Company, of New York.

CONTRACT WORTH £1,500,000 for steel fabrication at the new strip mill of Richard Thomas & Baldwins, Limited, at Llanwern (Mon), has been won by Alexander Findlay, Limited, structural engineers of Motherwell.

THAILAND has placed with Moon Bros., Limited, Birkenhead, one of Britain's biggest single export orders for drum-making machinery. The machines will form part of a new oil refinery and the first will be ready in October.

CONTRACT WORTH about £350,000 has been awarded to Taylor Woodrow Construction, Limited, by the Solartron Electronic Group, Limited, for the construction work of the second stage of Solartron's £1,250,000 expansion scheme at Farnborough.

TWO DIESEL TUGS have been ordered from Clyde shipyards by Steel & Bennie, Limited, the Glasgow tug-owners. One will be built by George Brown & Company (Marine), Limited, at Greenock, and the other by Scott & Company (Bowling), Limited.

CENTRIFUGAL AIR COMPRESSORS and driving motors, worth nearly £500,000 have been ordered from the heavy plant division of Associated Electrical Industries, Limited, by British Oxygen Engineering, Limited. The order consists of six centrifugal compressors, six 11 kv. synchronous motors, and six 11 kv. synchronous induction motors.

ENGINEERING FIRM of W. H. Allen, Sons & Company, Limited, Bedford, has been awarded a £600.000 contract by Oil India (Private), Limited, for machinery for a crude oil pipe-line in northern India. The pipeline will run 720 miles from Upper Assam to refineries at Barauni in the State of Bihar. The company is to supply 30 engines for pumping duties at nine stations and 21 for electricity generation in seven power stations.

NEW CONTRACT WORTH £400,000 has been awarded to Sir Robert McAlpine & Sons, Limited, in connection with the general expansion at the works of the Consett Iron Company, Limited. Sir Robert McAlpine & Sons is already engaged on the extensive foundations costing about £1,000,000 for the company's new plate mill at Consett. The latest contract, also for foundation work, is for a new oxygen steel plant and associated buildings at the works. It will take about a year to complete.

GEORGE KENT, LIMITED—Mr. J. F. Willsher has been appointed a director.

Birmetals' £1,000,000 Aluminium Strip Mill

STRIP mill costing £1,000,000 and devoted to the rolling of aluminium alloys, was set in motion on Thursday of last week at the Woodgate Works, Quinton, Birmingham, of Birmetals, Limited, by the Marquess of Exeter, chairman of Birmid Industries, Limited. The mill is the first of its kind in Europe.

When in full operation it will roll between 12,000 and 20,000 tons of aluminium sheet a year. From a 50-in. reversing mill the alloys will be rolled in coil form at speeds up to 1,600 ft. a minute. To obtain maximum benefit from the mill, it is necessary to feed it with the longest possible coil from earlier operations; it will take a coil up to 10,000 lb. in weight.

To cast a rolling slab capable of producing a single coil of this weight and to have a hot mill capable of rolling this slab, would have meant an outlay of a further £2,000,000. This problem was overcome by welding together a number of smaller coils of the desired width to form a heavy coil. A scheme was formulated for flash butt welding of strip iron up to 52 in. wide. The result is that the welding line, composed of a number of ancillary units and the flash butt welding unit, now forms a complete group producing the desired heavy coil.

"Waste" Slag Base for Colvilles Plant

SLAG dumped as waste at Tollcross, Glasgow, a century ago is being salvaged to help build the foundations of the new strip mill of Colvilles, Limited, at Ravenscraig and Gartcosh. An article in the current issue of Colvilles Magazine says: "Its attraction from the engineering and commercial points of view is that it combines all the characteristics of an absolutely consistent natural rock with ease of access. It costs on average about 4s. a ton to blast rock out of a quarry, but at Tollcross a material as uniform and reliable is there for the picking up."

The slag—3,000,000 tons of it—comes from the Clyde Iron Works at Tollcross. Its potentialities were investigated by Colvilles-Clugston, Limited, and although it looked like any other slag, its composition was such that a large part of it complied with British Standard Specifications as an aggregate.

Since a handling and crushing plant went to work there 11 years ago, 1,000,000 tons of slag have been emptied from the Tollcross bing and more than 250,000 tons have already been transported by road to the site of the strip mill. In addition new slag is also being processed—at the rate of 100 tons an hour—to meet the demand from all over Scotland.

The commercial uses of the slag are so extensive that a second plant has been built to process the slag output from Ravenscraig when it is in operation.

GOVERNMENT OF Eastern Nigeria is determined to establish an iron and steel industry in the Region, it is announced. The necessary survey on which the Government will base its future action is being undertaken by the Ford Foundation. Eastern Nigeria contains large iron, coal, and limestone deposits.

Appointments

Quality Control Engineer for Brighton Firm

QUALITY control engineer appointed by West Instrument, Limited, at its Brighton factory is Mr. H. McGlyn, well known for his contributions to industry in the instrument field and as the representative of the Engineering Equipment Users' Association on the British Standards Institute Committee for the graduation of instruments.

MR. H. MCGLYN

Since the end of the war, Mr. McGlyn has been with Imperial Chemical Industries, Limited, first as engineer in charge of electrical and instrument standards and secretary of the company's Instrument Standardization Committee, and later as instrument design engineer at the Birmingham headquarters of the metals division. Here he worked on a titanium plant and on the initial layout of a beryllium project. More recently he has been at the Central Instrument Laboratory, Pangbourne, where he was concerned with the development of special equipment for experiments in automatic control.

Mr. R. V. CUTTS, technical sales manager of British Furnaces, Limited, Chesterfield, has been appointed technical sales director.

Mr. JOSEPH MAUGHAN, manager of Havannah Drift Colliery, Wideopen (Northumberland), has been appointed manager of the Rising Sun Colliery (Northumberland).

Mr. W. R. TODD, of Ferro Enamels England, Limited, has been appointed director of commercial development (foreign) of the parent company, Ferro Corporation, of Cleveland, USA.

Dr. D. V. AGER, Lecturer in Geology at the Imperial College of Science and Technology, London University, has been appointed to the university Readership in Geology tenable at the college.

Mr. JAMES S. SMITH, for the past five years general manager of Herd & Mackenzie, shipbuilders, of Buckie (Banff), has been appointed general engineering manager of John Lewis & Sons, Limited, shipbuilders, of Aberdeen.

Mr. GEORGE BEEBEE has been appointed comptroller of the British divisions of the Yale & Towne Manufacturing Company, Limited, Wednesfield and Willenhall. He joined the company in 1934 as a cost clerk.

Mr. A. W. JOHNSON has been appointed Scottish branch manager of Priestman Brothers, Limited, manufacturers of excavation plant, etc., of Hull. He will operate from its sales and service department in Glasgow.

Mr. J. BRAILSFORD, formerly east Midlands representative of Padley & Venables, Limited, pneumatic tool manufacturers, of Sheffield, has been appointed the company's public relations officer. Mr. C. JENKINS becomes area manager of the east and west Midlands areas, and Mr. S. WHITFIELD, formerly Durham representative, has been appointed Scottish manager. Mr. Whitfield will operate from 36, Dunster Road, Causewayhead, Stirling.

AVO, Limited, a company in the Metal Industries, Limited, group, has appointed Mr. W. INNES as chief accountant. He is at present cost accountant with another MI company, John Allan & Company (Glenpark), Limited.

Mr. GEORGE ARMSTRONG, of Joliet, US, has been appointed manufacturing manager for Britain of the Caterpillar Tractor Company, Limited, and will coordinate the manufacturing activities of the Tannochside, Newcastle, and Leicester factories.

NUM Fears Dwindling Manpower in Midlands

RESOLUTION expressing serious concern at the dwindling manpower in West Midlands pits is to be put before the Midland Area conference of the National Union of Mineworkers in Stoke-on-Trent this month. The resolution, from Pooley Hall (North Warwickshire) branch, refers to the "very serious shortage of manpower particularly day wage workers," which might result in work at some coal faces having to be stopped.

The branch feared that this in turn might result in downgrading of face workers from contract to day wage work. The resolution instructed the Area executive to give full consideration to safeguarding the members. Commenting on the resolution, Area secretary Mr. J. H. Southall said: "We are losing hundreds of miners every week and at the present rate of loss we shall soon be down to 40,000 men in the West Midlands Division."

If the loss continued at the present rate, he said, it might mean the closure not only of coal faces, but of entire pits. Mr. Southall said that one of the most serious features of the decline was that it was largely among the craftsmen. Warwickshire was the district most badly hit.

Coupled with this, comes news that Berry Hill Colliery, Fenton, near Stoke-on-Trent, closed this week. During the Easter weekend, 420 men will be transferred to other pits in North Staffordshire, and for an initial period the remaining 130 men will be retained at the colliery for dismantling and recovery work.

An NCB spokesman said: "All the men have been personally interviewed to safeguard their future and utilize their experience to the best advantage and men and management at receiving pits are also being most co-operative." Hem Heath and Florence collieries will absorb about 240 of the men. The remainder will be spread among Stafford, Fenton, Wolstanton, Sneyd, Hanley Deep, Whitfield, Norton Mossfield, Parkhall, Holditch, and Foxfield collieries.

OVER 30,000 TONS of iron and other ores—5,000 tons more than in the corresponding period last year—contributed to increased imports traffic through Middlesbrough for the four weeks ended March 22. Exports of iron and steel goods fell by over 5,000 tons to 25,170 tons. A decline of over 50,000 tons in trade for the first quarter of the year through Hartlepools Dock was largely due to a fall in coal shipments to 122,917 tons.

The Scrap Markets

Imports Help Out Home Shortage

RESUMPTION of imports on a fairly extensive scale is indicative of the tight conditions in the ferrous scrap trade. It remains an expensive expedient and is obviously forced upon the steel industry by the inadequacy of deliveries from home sources.

Availability of the high-grade material sought for steelworks' use is far too meagre and the one consolation is that it has made easier the disposal of light and inferior grades which not so long ago were a drug on the market.

Cleveland—Foundry consumers are in need of more sheet steel scrap of good quality, but their cast-iron requirements can be covered without much difficulty.

Having to bring in ferrous scrap from oversea sources is undeniable evidence that merchants are finding it impossible to keep pace with the incessant and growing demands from the steelworks.

South Wales—Merchants are making valiant efforts to bring into the South Wales area all parcels of heavy grade scrap available. An unceasing demand from steelworks and ironfoundries for supplies of scrap is maintained, and many are now working on a day-to-day basis. There is a real shortage and although there is some movement in the lighter grade material, the main demand is still for the heavier and better grades. All sources of supply are being tapped, and the market is extremely active.

Imports are being received in small quantities at South Wales ports, but the quality of this scrap leaves much to be desired, and it is useful only because other supplies are in such short supply. None of the local works is carrying stocks of scrap on the ground and reserves in merchants' yards are negligible.

It is not expected that any of the steelworks will close over the Easter holiday, so the scrap position will not get much relief. Merchants, however, are closing down for the statutory holiday.

Lancashire—A steady demand for most descriptions of iron and steel scrap materials on the Lancashire markets continues to be reported. Supplies of light and heavy steel melting scrap are coming forward in fair quantities and are finding a ready outlet at the mills. There is also a reasonably steady demand for cast scrap materials by the foundries. The machinery scrapping process at the cotton mills under the Government reorganization scheme came to an end last week and a steady dwindling of scrap supplies from this direction during the coming weeks is expected.

Scotland—The major portion of the business is being conducted with the steelmakers whose requirements of heavy steel and basic scrap are at a very high level. The steelmakers' order-books are well filled for some considerable time ahead and the demand for suitable steelmaking scrap is likely to be intense for a prolonged period. Deliveries are being effected at a fairly steady rate and, if anything, there has been a slight improvement in the tonnage delivered during the past week.

The output of steel turnings remains fairly constant and regular consignments are going forward to the consuming works.

Board Changes

New Appointment for Mr. D. E. Graham

MANAGING director of James Archdale & Company, Limited, machine-tool makers, of Birmingham, Mr. Douglas E. Graham has been elected to the board of the parent company, the STAVELEY COAL & IRON COMPANY, LIMITED, of London, S.W.1.

Mr. Graham, who is the vice-chairman of the Council of the Institute of Export, became managing director of James Archdale in September of last year.

RUSTON & HORNSBY, LIMITED—Mr. C. J. Hind has been appointed engineering director.

WICKMAN, LIMITED—Following the death of Mr. G. R. Marsh, Mr. C. F. Watts has been appointed to the board.

W. H. ALLEN SONS & COMPANY, LIMITED—Mr. J. W. Boddy and Mr. P. C. Saltmarsh have been appointed to the board.

MASSEY-FERGUSON (UNITED KINGDOM), LIMITED—Mr. Lionel Harper, assistant managing director, has resigned from the company.

NORTH BRITISH RUBBER COMPANY, LIMITED—Mr. Edward J. Higgins has been appointed to the board. He succeeds the late Mr. Ludwig C. Boos.

HERBERT MORRIS, LIMITED—Mr. P. B. Tucker, managing director of the subsidiary, Craven Bros. Crane Division, Limited, has been appointed to the board.

WANKIE COLLIERY COMPANY, LIMITED—Mr. K. C. Acutt has been appointed chairman in succession to Mr. T. Coulter who has resigned because of other commitments but will remain on the board.

S. J. CLAY, LIMITED—Mr. Russell Bailey has succeeded Mr. Duncan Bailey on his retirement as chairman. Mr. Bailey remains a director and Mr. Stewart Kilpatrick, Jnr., has joined the board.

CARNTYNE STEEL CASTINGS COMPANY, LIMITED—Mr. James Brennan has been appointed managing director in succession to Mr. John Gibb who has retired as an executive director but will continue in a non-executive capacity.

BRITISH PETROLEUM COMPANY, LIMITED—Mr. Maurice Bridgeman is to succeed Sir Neville Gass, who is retiring as chairman as from July 1. Mr. J. M. Pattinson is to be deputy chairman and Mr. M. A. L. Banks is to join the board.

THOMAS STOREY (ENGINEERS), LIMITED—Following the acquisition by Acrow (Engineers), Limited, Mr. W. A. Best and Mr. L. Cuthbert have joined the board. Mr. J. Holmes, London sales manager, has been appointed sales director.

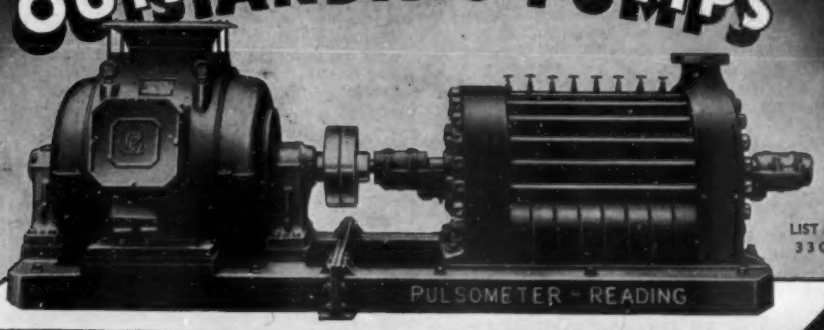
WILMER LEA FOUNDRIES, LIMITED—Mr. Charles Karen, chairman of Charles Karen & Son (Holdings), Limited, has become the new chairman and joint managing director following a bid by the Karen Group for the capital of Wilmer Lea Foundries and its acquisition of a substantial majority holding.

LAPORTE INDUSTRIES, LIMITED—Mr. C. B. Bolland has been appointed executive chairman of Laporte Acids, Limited, the Sheffield Chemical Company, Limited, James Wilkinson & Son, Limited, and Glebe Mines, Limited, all subsidiaries of the company, in place of Mr. James Jones who will relinquish these positions, but will remain on the board of the company. Mr. Alexander M. Fenton has retired as a director of Sheffield Chemicals, James Wilkinson & Son, and Glebe Mines.

Pulsometer Engineering Co. Ltd.

NINE ELMS IRONWORKS READING, BUILDERS OF

OUTSTANDING PUMPS



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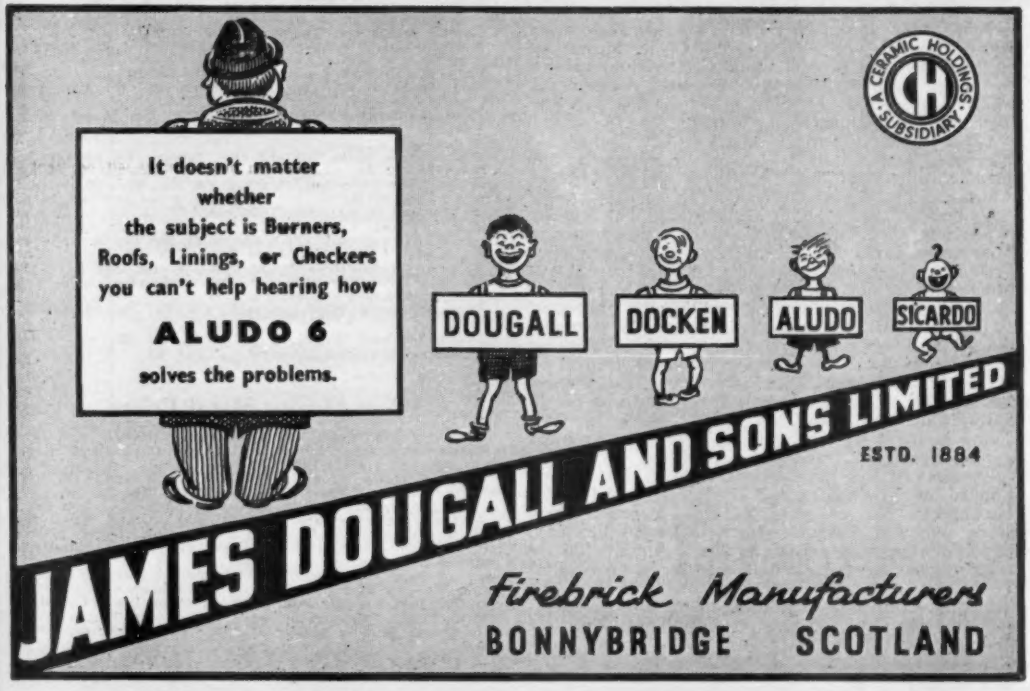
UP TO 3,600 FEET

OFFICES IN: LONDON, BIRMINGHAM, CARDIFF, GLASGOW, LEEDS, MANCHESTER, NEWCASTLE-ON-TYNE



News in Brief

POLLARD BEARINGS, LIMITED, Ferrybridge, has acquired the ex-Ministry of Supply property at Monkhill Lane, Pontefract.

A TREATMENT WORKS is to be constructed at a cost of £399,390 for water supplies to the Spencer steelworks, Llanwern (Mon).

THE London office of Uddeholm, Limited, is now at 124, Victoria Street, London, S.W.1 (telephone: VICtoria 6780 and 5711).

STATEMENT TO the effect that US steel price increases would not start until 1961 and would then not be uniform was made by the Wheeling Steel Corporation in New York last week.

COAL OUTPUT last month in the European Coal and Steel Community was 20,990,000 metric tons, against 19,670,000 tons in February, and 19,881,000 tons in March last year. Stocks increased slightly in the first weeks of the month.

WITHIN THE next two years, the Bethlehem Steel Company, of Pennsylvania, will increase the annual capacity of its Sparrow Point Works, Maryland, by a further 800,000 short tons (about 10 per cent.). The expansion forms part of the company's $197,000,000 investment programme.

OPEN-CAST LIMESTONE mining industry, covering 325 acres near Dunbar and employing 314 workers, may soon be set up by Associated Portland Cement Manufacturers, Limited. The company has applied for planning permission to the East Lothian County Council for the £4,000,000 project.

FOLLOWING the establishment of sales companies in France, Germany, and Italy, Joseph Lucas (Industries), Limited, Birmingham, is continuing its expansion programme by forming a Swedish sales company, Lucas Nordiska, AB, to cover all the Scandinavian countries, including Finland.

AFTER FIVE WEEKS 26 riveters who went on strike because welders and platers at the Clyde shipyard of William Denny & Bros., Limited (Dumbarton), refused to accept redundant riveters in their departments, returned to work on Monday, as did the 600 men who were laid-off because of the dispute.

LONDON FIRM of shiprepairers, Rye-Arc, Limited, has purchased the Nelson Dry Dock, Rotherhithe, and premises formerly owned by Mills & Knight, Limited, which recently ceased business. The dock is one of the oldest in London and it is understood that Rye-Arc is planning a considerable modernization programme.

AFTERNOON TEA BREAK, which was the cause of a five-day strike by over 500 men employed by Sheepbridge Engineering, Limited, Chesterfield (Derby), is to be retained. The men, who claimed that the "historic" 10-minute break had been eliminated on the introduction of the 42-hour week, returned to work on Monday.

TECHNICAL SALES organization has been formed by Hardy Spicer, Limited, Birmingham, and Jean Walterscheid, KG, of Germany. It will be known as Hardy Spicer-Walterscheid, and will be responsible for marketing in the UK, Commonwealth, and certain other oversea territories, range of agricultural products.

AGREEMENT HAS BEEN signed between BSA Tools, Limited, of Birmingham, and Harford Pumps, Limited, of London, W.1, to make the Opio glandless circulating pump in England. Harford Pumps has been importing the pump from Sweden. A unit for the mass production of the pumps is to be set up by BSA Tools.

BRITISH COUNCIL is sponsoring the visit of Sir Willis Jackson, president of the Institution of Electrical Engineers, and its secretary, Mr. W. K. Brasher, who are holding discussions in Poland on the training of electrical engineers. They have been invited by the Polish Minister of Higher Education, Mr. Henryk Golanski.

NEGOTIATIONS have been completed by British Ropes, Limited, with the New Zealand Government to set up a wire ropery in Auckland to supply the major part of the domestic needs of New Zealand. A new factory is to be built and the company will supply an already established sales network throughout the two islands.

TO SERVE the south Lancashire area, new scrap works and office block of Thos. W. Ward, Limited, engineers, ironfounders, metal merchants, etc., of Sheffield, was opened by the chairman, Mr. H. W. Secker, at Salford on Monday. Accompanying Mr. Secker were the deputy chairman, Mr. Arnold Carr, and Mr. J. S. Bradshaw, Mr. W. Hall, and Mr. D. F. Walton, directors of the company.

WORLD'S LARGEST vacuum melting furnace, so it is claimed, is to be built for Midvale-Heppenstall, Philadelphia, US, by Consolidated Vacuum Corporation, New York. The vacuum arc type furnace is being planned and designed by the West German firm, W. C. Heraeus, GmbH, and has an expected annual capacity of 8,000 tons. Ingots up to 40 in. in diameter and weighing 25 tons will be made at first, but the furnace has facilities for research into the production of 60 in. diameter ingots weighing 40 tons.

Ferro-alloy Prices

(Per ton, unless otherwise stated, delivered)

FERRO-SILICON (6-ton lots and over)—45 per cent. Si, £41 10s. to £44, scale 15s. per unit, lumpy; 75 per cent. Si, £57 to £62 10s., scale 15s. per unit, lumpy.

FERRO-VANADIUM—50/60 per cent., 22s. 6d. per lb. of V.

FERRO MOLYBDENUM—65/70 per cent., carbon-free, 12s. 10d. per lb. of Mo.

CALCIUM MOLYBDATE—12s. 4d. per lb. of Mo.

MOLYBDIC OXIDE BRIQUETTES—11s. 10s. per lb. of Mo, delivered United Kingdom.

FERRO-BORON—23/25 per cent., 7s. 6d. per lb.

FERRO-TITANIUM—20/25 per cent., 2-3 per cent. Cu, £250; 38/40 per cent., commercially carbon-free, £287.

FERRO-TUNGSTEN—80/85 per cent., 11s. 8d. per lb. of W.

TUNGSTEN METAL POWDER—98/99 per cent., 14s. 8d. per lb. of W.

FERRO-CHROME (6-ton lots and over, lumpy)—4/6 per cent. C, £78 10s. to £82 10s., basis 60 per cent. Cr scale 26s. to 28s. 6d. per unit; over 6 per cent. C, £77 to £80 10s., basis 60 per cent. Cr, scale 26s. to 28s. 6d. per unit; max. 2 per cent. C*, 1s. 8d. to 1s. 11d. per lb. Cr; max. 1 per cent. C*, 1s. 8¾d. to 1s. 11¾d. per lb. Cr; max. 0.15 per cent. C*, 1s. 9¼d. to 2s. 0¼d. per lb. Cr; max. 0.10 per cent. C*, 1s 9¾d. to 2s. 0¾d. per lb. Cr; max. 0.06 per cent. C*, 1s. 10¼d. to 2s. 1d. per lb. Cr.

METALLIC CHROMIUM—98/99 per cent., 6s. 10d. per lb.

METALLIC MANGANESE—94/96 per cent., carbon-free, £275; 96/98 per cent., £285.

FERRO-COLUMBIUM—65/67 per cent., Cb+Ta, 19s. 9d. per lb., Cb+Ta.

FERRO-MANGANESE (home)—78 per cent., £63 10s.

* *Average 68-70 per cent. Cr.*

Non-ferrous Metal Prices

(Delivered, unless otherwise stated)

Copper—Solid-drawn tubes, 2s. 5¾d. per lb.; rods, 275s. per cwt. basis; 20 s.w.g., 310s. per cwt.

Brass—Solid-drawn tubes, 2s. 9¾d.; sheets up to 10 w.g., 224s. per cwt.; wire, 2s. 10¾d.; rolled metal, 224s. per cwt.

Lead Sheets, etc.—Sheets, £115 15s.; pipes, £118 per ton.

Zinc Sheets, etc.—Sheets, 15 g. and thicker, ex works, English destinations, £127 5s.; rolled zinc (boiler plates), ex works, all English destinations, £125; zinc oxide (Red Seal), d/d buyers' premises, £105 per ton.

Other Metals—Nickel, £600. Aluminium ingots, £186. Antimony, English, 99 per cent., £190. Quicksilver, ex warehouse, £70 10s. Bismuth (per lb.), 16s. nom. (1-ton lots). Cadmium, 10s. 6d. per lb. Magnesium ingots (per lb.), 2s. 2½d. to 2s. 3d., notched bar 2s. 9½d.; powder 6s. 1d. Platinum, per oz. (troy), £30 5s.

Electrical Aids in Industry

Data Sheet **No. 12**

Dielectric Heating - 3

Some further details of the uses to which dielectric heating can be put are given in this data sheet, being continued from data sheet No. 11.

The Woodworking Industry

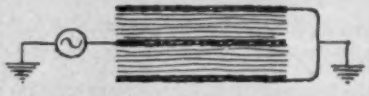
A most important development in recent years in the woodworking industry has been the introduction of synthetic resin adhesives of the thermosetting type for the bonding of wooden components. Setting of these resin adhesives proceeds at a rate largely determined by temperature. For instance, urea formaldehyde sets as follows :

TEMPERATURE	SETTING TIME
65°F	3 hours
80°F	1 hour
150°F	3 minutes
190°F	1 minute

The resultant bonded joint is equally satisfactory in each case. Most of the power supplied when dielectric heating is used is absorbed by the resin, the heat thus being concentrated where required.

Plywood

With dielectric heating consuming power only during the heating cycle, plywood can be produced with considerable savings in heating times and costs.



For example, in a press holding 100 3-ply ¼" thick assemblies, the resin glue is set in 20-30 minutes, depending upon the dryness of the wood.

Curved Laminated Sections

Curved laminated sections are being increasingly used in contemporary furniture, and with dielectric heating rapid production can be achieved using wooden shaping blocks in single daylight presses. An alternative method of providing heat by conduction from heated metal strips is much slower as the total section thickness rises above 0.05 inch.

Furniture Assembly

Because of the savings in glueing processes already instanced, dielectric heating is being extensively used in the furniture trade. It leads also to reductions in labour and floor space, with the elimination of assembly jigs. The heating equipment can be placed directly in the production line, cutting handling to a minimum.

Blockboard

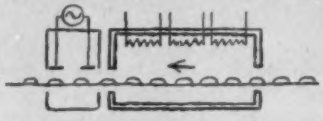
Blockboard, having large areas of glue line, provides an excellent use for dielectric heating, which gives considerable savings in time and labour.

Other Resin-bonded Products

Dielectric heating is also used in the manufacture of other resin-bonded or impregnated products such as grinding wheels, fabrics, felts, etc.

Foodstuffs

Increased use is being made of dielectric heating in many food processes; these include defreezing and melting, sterilisation and disinfestation, drying of break-



fast cereals, dog biscuits, etc., and similar applications. Some cooking processes, such as bread baking, are technically possible, but dielectric heating gives an 'unbrowned' product. In the biscuit trade, however, dielectric heating is combined with conventional baking to produce normal biscuits in ½ to ¼ the usual baking time.

The examples given here cover only a part of the field open to dielectric heating.

For further information, get in touch with your Electricity Board or write direct to the Electrical Development Association, 2 Savoy Hill, London, W.C.2. Telephone : TEMple Bar 9434.

Excellent reference books on electricity and productivity (8/6 each, or 9/- post free) are available—"Induction and Dielectric Heating" is an example.

E.D.A. also have available on free loan in the United Kingdom a series of films on the industrial uses of electricity. Ask for a catalogue.

7560/4

CURRENT PRICES OF IRON AND STEEL

(Delivered, unless otherwise stated)
April 13, 1960

PIG-IRON

Foundry and Forge Iron.—No. 3 iron, Class 2, Middlesbrough, £21 6s.; Birmingham, £20 18s. 3d., 10-ton lots or over.

Low-phosphorus Iron.—Over 0·10% to 0·40% P, 10-ton lots or over, £23 5s., delivered Birmingham, £23 10s., delivered Grangemouth.

Basic Pig-iron.—Delivered in Staffs, Derbyshire, Notts, Lincs, Rutland, Northants, and Leics, 10-ton lots or over, £20 3s.

Hematite.—Si up to 2%, S & P 0·03-0·05%: N.-E. (local iron), £23 19s.; Scotland (Scotch iron), Zone S.1, £24 5s. 6d.; Sheffield, £25 7s. 6d.; Birmingham, £25 14s.; Wales (Welsh iron), £23 19s., 10-ton lots or over in each case.

Refined.—Cylinder and refined irons, South Zone £25 9s., North Zone £25 6s. 6d. Refined malleable, max. 0·10% P. South Zone £26 9s., North Zone £26 6s. 6d.

MANUFACTURED IRON

(Bar basis, 2½ in. to ¾ in.)

CROWN IRON: England and Wales (Zone 1), £48 10s.; Scotland, £48 5s.; Ireland, f.o.q. Belfast, £50 7s. 6d.; all other Northern Ireland ports, £50 10s., f.o.q. Cable iron, £1 extra.

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—BASIC: Soft, u.t., 100 tons and over, £31 15s. 6d.; tested, 0·08-0·33% C, 6 to 35 tons, £33 15s. 6d.; hard (0·41-0·60% C), under 10 tons, £34 17s.; silico-manganese, under 10 tons, £43 16s. 6d.; free-cutting steel up to 0·25% C, under 10 tons, £36 14s. 6d. SIEMENS-MARTIN ACID (under 10 tons): Up to 0·25% C, £41 1s.; silico-manganese, £44 4s.

Billets, Blooms, and Slabs for Forging and Stamping.—Lots of under 10 tons. Basic, soft, up to 0·33% C, £38 10s.; basic, hard, over 0·41 up to 0·60% C, £39 12s. 6d.; acid, up to 0·25% C, £43 4s.; acid silico-manganese, £46 7s.

Alloy Steel (5 tons to under 10 tons).—BILLETS, 3 in., up to and including 10 in., for re-rolling, 0·6/1% Ni, £47.; Ni 2·75/3·75%, Cr 0·5/1·10%, £73 17s.; Ni 2·75/3·75%, Cr 0·5/1·3%, Mo 0·2/0·65%, £84 7s. BARS: 1 in. dia. and up, nickel, £67 17s.; nickel-chrome, £98 11s.; nickel-chrome-molybdenum, £111 4s.

Other Semi-products, etc.—Forging ingots, up to 0·60% C, £31 12s. 6d. f.o.t.; tube billets, under 10 tons, £40 10s.; shell steel billets for direct forging up to and including 0·33% C, 100 tons and over, £37 15s.; tin bars and sheet bars, 50 tons and over, £32 10s. Wire rods, 3g. to 4g. (all areas except Birmingham, Scotland, Southern Joint Area, and Northern Ireland): Soft basic, under 50 tons, £41 2s.; hard basic, under 10 tons, £44 8s.; free-cutting, up to 0·25% C, under 10 tons, £46 12s.; acid, up to 0·75% C, under 10 tons, £54 14s. 6d. Stainless steel billets, 3 in. and over, 5 tons to under 10 tons, Austenitic, £229 10s.; martensitic, £141 10s.

FINISHED STEEL

Heavy Products (1 ton to under 10 tons).—Mild-steel plates, ordinary qualities, N.-E. Coast and Northern Joint Areas and Central Scotland, £41 12s.; medium plates, all areas of England and Wales, £45 1s. 6d.; boiler plates, N.-E. Coast and Northern Joint Areas and Central Scotland, £44 2s.; floor plates, N.-E. Coast, £43 1s. Sections (N.-E. Coast, Midland, and Northern Joint Areas, and Central Scotland): Angles, £38 16s. 6d.; bars (rounds and squares), £41 6s. 6d.; flats, £39 1s. 6d.; joists, £38 12s. 6d.

Rolled and Re-rolled Steel Products.—N.-E. Coast, Midland, Northern Joint, and South Wales Areas, and Central Scotland, 50 tons and over: Angles and tees, 4 in. and under, £40 18s. Channels, 3-in. web and under, £40 18s. Flats, 5 in. wide and under, and rounds and squares, under 3 in.: Untested soft basic, £39 1s.; free-cutting, £45 1s. 6d.; hard basic, £41 19s. 6d.; Siemens Martin acid, £49 0s. 6d.; spring steel, basic, £44 4s. 6d. spring steel, acid, £52 19s. Glazing tees, £47 0s. 6d. Sash and casement sections, £43 13s. 6d. Gate channels, £50 17s. 6d. Ferro-concrete bars (10 tons to under 500 tons), £39 10s.

Sheets and Strip.—Uncoated strip mill coils, hot rolled, under 3 mm. to 12g., mill run, mill edge, 25 tons to under 50 tons, £43 16s.; cold reduced, 17/20g., side trimmed, skin passed, £49 16s. Black sheets, 24g., 10 tons and over, £57 14s. 6d.; galvanized corrugated sheets, 24g., 10 tons and over, £68 5s. Cold-rolled steel strip, coils, hard temper, not annealed, 10 tons to under 20 tons, £55 5s. Hot-rolled hoop and strip, u/t soft basic, 100 tons and over, £38.

Tinplates.—Cold reduced, hot dipped, 15 tons to under 50 tons, 66s. 8d. per basis box of 108 lb., f.o.t. makers' works. Cold reduced electrolytic, 59s. 9d. per basis box.

Colliery Rails and Arches.—Arches, 4 in. × 2½ in. × 2 in., re-rolled £39 15s., 3 in. × 3 in., re-rolled £40, 3½ in. × 3½ in., re-rolled £40 7s. 6d., 4 in. × 2½ in. × 2 in., prime £44 6s. 9d. Other sections, prime £44 11s. 9d. Extra fishplates, £52 10s. Cambered girders, 4 in. × 2½ in. × 2 in., re-rolled £38 9s., 3 in. × 3 in., re-rolled £38 11s. 6d., 3½ in. × 3½ in., re-rolled £38 18s. 6d., 4 in. × 2½ in. × 2 in., prime £43 4s. Other sections, prime £43 6s. 6d. Benk bars, standard type, prime material, all thicknesses, £38 11s.; re-rolled, up to ¾ in., inclusive, £37 6s.; over ¾ in., £38 11s. "W" type bars, prime steel, all thicknesses, £41 1s.; re-rolled, up to ¾ in., inclusive, £39 16s.; over ¾ in., £41 1s.

Bright Steel (10 tons to under 20 tons).—Bars, no analysis or test, £52 8s. 6d.; flats, untested, £70 3s. 6d.

High-speed Tool Steel.—Finished bars, 5% cobalt, 10s. 10d.; 14% tungsten, 6s. 11d.; 18% tungsten, 7s. 9d.; 22% tungsten, 9s. 2d.; 4/6 quality molybdenum tungsten, 6s. 3d.; 6/6 quality molybdenum tungsten, 6s. 5d.; 5/6/2 quality molybdenum tungsten vanadium, 6s. 7d. per lb.

Rails, etc.—F.B. rails, heavy, 75 lb. to under 90 lb., 500 tons and over, f.o.t., £39 15s.; fishplates for rails 80 lb. and over, 50 tons and over, f.o.t., £53 11s.; soleplates, f.o.t., 100 tons and over, £51. Light flange rails, 25 lb. and under, d/d N.-E. Coast, Midland, Northern Joint, and South Wales Areas, and Central Scotland, 50 tons and over, £40 17s. 6d.; fishplates for light rails, 50 tons and over, £50 12s. 6d.

BLAST-FURNACE COKE

(F.O.T. at Ovens)

DURHAM AND NORTH-EAST COAST: 159s. 3d. SOUTH WALES: 158s. NOTTS AND DERBY: 135s. 5d. LANCASHIRE: 146s. STAFFORDSHIRE: 139s. 5d. YORKSHIRE: 138s. 8d. SCOTLAND: 169s. 4d.

(All prices are subject to quality differentials.)

STEELWORKS SCRAP

(Plus 5 per cent. in the case of sales by merchants.)

	Scotland.	N.-E. Coast.	Midlands.	Sheffield.	Lancs.	S. Wales (East)	S. Wales (West)
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Heavy steel scrap* ..	229 3	228 3	220 0	226 3	226 3	227 3	232 3
Heavy mixed scrap*	207 3	206 3	198 6	204 3	203 9	205 3	210 3
Heavy steel turnings†	179 9	179 9	169 9	176 9	174 3	177 0	180 0
Heavy cast iron†	206 9	203 9	208 0	204 3	189 3	199 3	205 9
Cast-iron borings†	160 3	157 3	157 0	159 9	157 3	159 6	164 6

* Basis 500-ton lots in England and Wales and 250 tons and upwards in Scotland, delivered.

† Not less than 250 tons in England and Wales, 100 tons in Scotland.